



29 January 2004

Hand-delivered

Heather Boyd & Hope Smythe
Regional Water Quality Control Board – Santa Ana Region
3131 Main St.
Riverside, CA

RE: CEQA Scoping Issues

Dear Ms. Boyd:

On behalf of the members of the Big Bear Lake TMDL Task Force, and particularly the directors of the Big Bear Municipal Water District, we thank you for the considerable effort you have made to restore beneficial uses to the lake. We also sincerely appreciate the financial support provided by the Regional Water Quality Control Board and State Water Resources Control Board. We are very proud of the significant improvements made possible by Proposition-13 grant funding.

As the Regional Board considers adoption of a formal TMDL we would like to submit the following questions:

- * 1) What metrics and threshold values must be met in order to remove Big Bear Lake from the 303(d) list of impaired waterbodies?
- 2) By what standard will we know when beneficial uses (particularly COLD & REC1) are fully attained?
- * 3) How will the anti-degradation threshold be determined?
- * 4) How will the baseline (pre-anthropogenic) condition be defined for a man-made waterbody?
- 5) How will the Regional Board evaluate "economic considerations," as specified in Section 13241 of the California Water Code if the means of compliance are not yet known?
- * 6) How will natural nutrient and sediment loads be distinguished from the net increase in such loads caused by human activities?

- * 7) How will legacy loads, such as the nutrients stored in sediments washed into Bear Valley from the surrounding mountains long before the dam was built, be accounted for?
- 8) What is the legal distinction between water quality "goals" or "targets" differ from water quality "criteria" or "objectives?"
- * 9) What process would be required to change a water quality "goal" or "target?" Is EPA approval required to change a goal or target?
- 10) How will the Regional Board determine what level of water quality can "reasonably be achieved through the coordinated control of all factors which affect water quality in the area" as described in Section 13241 of the California Water Code? In particular, how will "reasonability" be assessed when evaluating various control alternatives?
- 11) How will the Regional Board apportion the load allocation between various non-point sources (proportionate to loading or based on ability to control the loads)?
- 12) How will the Regional Board implement the load allocations for non-point sources if there is no NPDES permit or Waste Discharge Requirements (WDRs) in place?
- 13) Does the Regional Board staff intend to recommend a "safety factor" for each TMDL? If so, how will the safety factor be determined?
- 14) If the scientific research studies demonstrate that in-lake sediment are contributing significant nutrient loads to the water column, will the Regional Board staff recommend dredging such sediments if necessary to meet water quality targets?
- 15) If dredging the sediments would cause more environmental damage than to leave it in place, will the Regional Board staff recommend revising the beneficial use classification pursuant to 40 CFR 131.10(G)(3)?

Thank you for allowing us the opportunity to raise these issues as part of the CEQA scoping process. Please call if you wish to discuss our questions in greater detail.

Respectfully submitted,



Timothy F. Moore
Risk Sciences
1417 Plymouth Dr.
Brentwood, TN 37027
Ph: 615-370-1655
Fax: 615-370-5188
tmoore@risk-sciences.com



United States
Department of
Agriculture

Forest
Service

San Bernardino National Forest
Supervisor's Office

1824 S Commercenter Circle
San Bernardino, CA 92408-3430
Phone: 909-382-2600
Fax: 909-383-5770
TTD: 909-383-5616

RUB-6/20

2005 JUN 17 PM 3:44

File Code: 2500/2520/2530-3

Date:

HAS 6/21
JMB 6/21

JUN 15 2005

Gerard Thibeault
Executive Officer
California Regional Water Quality Control Board
Santa Ana Region
3737 Main Street, Suite 500
Riverside, CA 92501

Dear Mr. Thibeault:

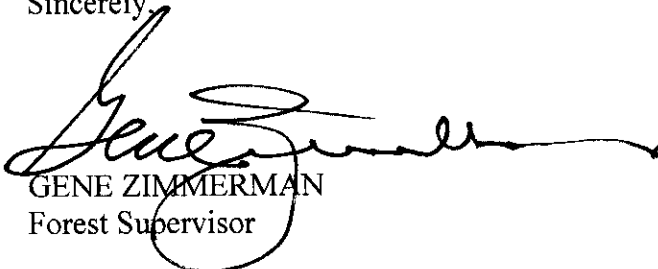
The San Bernardino National Forest supports the Santa Ana Regional Water Quality Control Board's efforts to address nutrient-induced water quality impairments in Big Bear Lake. As a Water Quality Management Agency, the Forest has substantial authority and responsibility for managing and protecting our lands and associated waters.

We have some significant concerns, though, that were not addressed in the stakeholder meeting March 15, or subsequent emails between representatives of our agencies. Given that there are significant questions related to the conclusions being drawn from limited available data, the Forest requests that the Draft Final version of the TMDL in question be released to interested stakeholders for a 30-day collaborative review prior to the 30-day release to the public. We would like to note that this pre-release process is being used by other Regional Boards in other areas of California.

We feel that there are major concerns that should be addressed by the stakeholders before it is released. The major stakeholders need a chance to address these concerns and an opportunity to resolve them before the document goes public. It is also very likely that once the stakeholders have this chance, it will help facilitate buy-in from the concerned public.

We appreciate the significant staff resources expended in developing the TMDL. With your concurrence to provide the stakeholders a copy of the document before release to the public, we feel that this would greatly enhance the process to complete this TMDL.

Sincerely,


GENE ZIMMERMAN
Forest Supervisor



cc: Brian Staab, Douglas Pumphrey



880 Summit Boulevard P.O. Box 77 Big Bear Lake, CA 92315 v. 909.866.5766 f. 909.866.3201

HAS
HMB
9/7/05

2005 SEP -6 PM 12:24

Jes now cc

September 2, 2005

Ms. Heather Boyd
California Regional Water Quality Control Board
Santa Ana Region
3737 Main Street, Suite 500
Riverside, CA 92501

Re: Comment on the Draft TMDL Plan for Big Bear Lake

Dear Ms. Boyd,

Snow Summit Ski Corporation, owner and operator of Bear Mountain and Snow Summit ski resorts, objects in the draft TMDL plan to our designation as a "Responsible Party". Since most of the acreage of our ski resorts is under Special Use Permit from the Forest Service, and the remaining acreage consists of our base areas which are within the city limits of Big Bear Lake, we fall within the jurisdiction of those agencies as well as that of San Bernardino County. Therefore, from a jurisdictional standpoint we are no different from any other business enterprise that lies within the boundaries of those agencies and should not be singled out.

However, we are unique in that for many years prior to the recent efforts to develop a TMDL plan for the Big Bear Lake watershed, our company, under the jurisdiction of the Forest Service, the City and the County has implemented comprehensive erosion/flood control/water quality measures, including re-vegetation, culverting, check dams and silt collection to fully mitigate impacts upon the lake caused by our activities. This, of course, is at variance with the proposed TMDL's assumption that recreational areas such as ours have taken no such measures.

Moreover, as a part of our contract with the Mutual Water District (MWD) for lake water for snowmaking, we are obligated to work with that agency to control runoff and silting and have worked off site in the Rathbun drainage to that end.

Inasmuch as we fall within the jurisdiction of the agencies that are properly designated as "Responsible Parties", and the fact that we are heavily engaged thereby in significantly reducing our impacts upon the lake, we respectfully request we be removed from the designation "Responsible Party".

Sincerely,

Richard C. Kun
President
SNOW SUMMIT SKI CORPORATION

Cc: Sheila Hamilton, MWD General Manager

RCK:dh



BEAR MOUNTAIN
43101 Goldmine Drive P.O. Box 77
Big Bear Lake, CA 92315
v. 909.585.2519 f. 909.585.6805
e: info@bigbearmountainresorts.com
www.bigbearmountainresorts.com

SNOW SUMMIT
880 Summit Blvd. P.O. Box 77
Big Bear Lake, CA 92315
v. 909.866.5766 f. 909.866.3201
e: info@bigbearmountainresorts.com
www.bigbearmountainresorts.com

SIERRA SUMMIT
59625 Highway 168 P.O. Box 236
Lakeshore, CA 93634
v. 559.233.2500 f. 559.233.3689
e: info@sierrasummit.com
www.sierrasummit.com

City of Big Bear Lake



HWS 9/7/05
HMB

2005 SEP -6 PM 12: 21

SES ee

September 2, 2005

Heather Boyd
Regional Water Quality Control Board – Santa Ana Region
3131 Main St.
Riverside, CA

Re: Letter of concerns from the City Big Bear Lake pertaining to the implementation of the TMDL's

Dear Ms. Boyd,

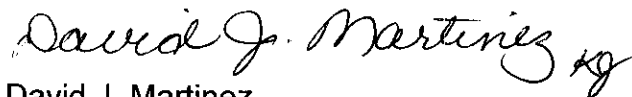
On behalf of the City of Big Bear Lake, we thank you for the opportunity to participate in the California Regional Water Quality Control Board Meeting held on August 26, 2005 at Big Bear Lake. As a Stakeholder in the Big Bear Lake TMDL's, we would appreciate responses to the following concerns:

1. How will natural sediment and nutrients from uncontrollable contributors such as the atmosphere, ash/erosion from fires, and wildlife animal waste be distinguished from the net increase caused by human activities and domestic pets?
2. Current water quality stations do not appear to be positioned to distinguish proportional contributory loads from S.B. Co. Flood Control District, USFS, or the City of Big Bear. How will individual accountability be established?
3. If current BMP's are properly installed and monitored but still do not achieve TMDL targets, will the Stakeholder(s) be penalized? Who is responsible for developing new BMP's when current BMP's do not achieve desired targets?
4. During winter the City of Big Bear and other agencies in the Big Bear Valley area place sand on icy roads for safety. How has this been factored into the proposed TMDL's?
5. We desire more specific information to define 'storm event'. The City of Big Bear is subject to localized short bursts of heavy rains primarily from monsoonal weather patterns. For example it is possible that a microburst occurs over the Rathbun Creek tributary area but not over the Knickerbocker Creek tributary area. Does this constitute a 'storm event' and trigger sampling as defined in Table 5-9a-o at all sampling locations or just the tributary impacted by the storm?

6. We desire more specific information regarding interruptions during 'snowmelt periods' and temperature measurements. What sampling are we required to do if we have multiple snowmelt periods separated by periods with below freezing temperatures? Do we restart the sampling process after each freezing period, which could last a few days or a few weeks? Will a single temperature station be identified for the Big Bear TMDL to trigger sampling or will sampling be triggered by an individual temperature reading at each sampling station?
7. The City of Big Bear Lake has limited funding and staffing. How will the RWQCB define and apply "economic considerations" for the City of Big Bear Lake relative to the pursuit of the proposed TMDL targets and tasks outlined in Table 5-9a-m?
8. Who will decide and how long will it take to judge whether the Watershed-wide Sediment Monitoring Plan is a 'reasonable plan'?
9. Will the proposed targets become law after adoption by the RWQCB or after adoption by the EPA?
10. How will mediation be handled if two or more agencies disagree on issues such as the Watershed-wide Sediment Monitoring Plan or methodology in identifying pollution sources or BMP's to achieve TMDL proposed targets?

Thank you for allowing us the opportunity to raise these concerns. We look forward to your responses.

Sincerely,

A handwritten signature in black ink that reads "David J. Martinez" followed by a stylized flourish.

David J. Martinez
Deputy City Manager
Development Services

cc: M. Perry, City Manager



HAS 9/15
HMB

12 12 3:15

2 September 2005

Heather Boyd
Regional Water Quality Control Board
3737 Main St., Suite 500
Riverside, CA

RE: Comments on Draft Nutrient TMDL for Big Bear Lake

Dear Ms. Boyd:

Thank you for the opportunity to review the draft nutrient TMDL for Big Bear Lake. The following comments were prepared at the direction of and submitted on behalf of the Big Bear Lake TMDL Task Force. Members of the Task Force include: the City of Big Bear Lake, San Bernardino County, the U.S. Forest Service, CalTrans, Big Bear Area Water Reclamation Authority, Big Bear Municipal Water District, East Valley Conservation District, and various local business such as the ski resorts and marinas. Many of these organizations and agencies were also planning to submit individual comment letters and we encouraged them to do so.

General Comments

The draft TMDL represents an extraordinary level of effort. And, we wish to commend the Regional Board staff for the time and expertise it took to prepare the document. Big Bear Lake and the surrounding watershed present an unusually complex technical and regulatory problem. Therefore, we strongly support the theme of the proposed Implementation Plan - to develop and apply a strategy of adaptive management based on the best available scientific information.

With this comment letter, members of the TMDL Task Force renew our on-going commitment to protect the existing beneficial uses in Big Bear Lake. As we stated in our oral presentation at the Regional Board's workshop last week, we fully understand and accept our obligation to mitigate any excess nutrient concentration which may flow to the lake as a result of development activities by humans residing on or visiting Bear Valley. We believe the goal should be to reduce nutrient loads throughout the entire watershed back to the natural ambient background concentrations that occur in the nearby undeveloped forest.

The remainder of our comments are organized to address topics in the same order as they appear in the TMDL Table of Contents.

1.0 Comments Related to the Problem Statement

- 1.1) The problem statement should be updated to accurately represent current conditions in the lake. Eurasian milfoil and coontail were virtually eradicated as a result of a large-scale herbicide application program initiated in 2002. Subsequent follow-up surveys each spring demonstrate that these invasive plant species have been eliminated and Big Bear Lake is no longer impaired by aquatic weeds. BBMWD now maintains a permanent, long-term spot re-treatment program to ensure that Eurasian milfoil and coontail do not recolonize the lake. If future monitoring efforts prove the continuing success of that effort, we recommend that Big Bear Lake be de-listed for noxious aquatic plants in the next biennial update of California's 303(d) list.
- 1.2) Big Bear Lake is not impaired by algae. The draft problem statement provides a general description of problems that may be caused by excess algae. However, it does not provide any evidence that excess algae growth is occurring in Big Bear Lake. On the contrary, the draft report states that:

"For the most part, Big Bear Lake has experienced few problems with excessive algae." (p. 40)

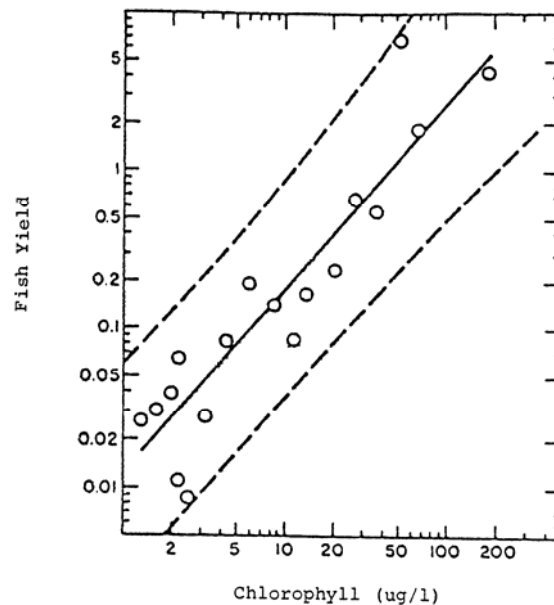
Algae blooms occasionally appear near the end of each summer. These blooms usually encompass a very small area and last only a few weeks. Naturally cool water temperatures preclude algal infestations from occurring on a scale that might impair beneficial uses in Big Bear Lake. In addition, the unusually large population of zooplankton also acts as a natural limit on algae growth in the lake.

Historical analysis indicates that small algae blooms have been occurring since the dam was first constructed in 1884. Apart from an obvious correlation with lake levels and water temperatures, there is no evidence to suggest that the frequency, duration or magnitude of algae growth is worsening. Consequently, there is no reason to believe that the narrative objective of the Basin Plan, prohibiting waste discharges from contributing to excessive algal growth, has been or is likely to be exceeded at Big Bear Lake.

- 1.3) Significantly reducing algae concentrations in Big Bear Lake may reduce overall productivity of the fishery. If the amount of algae declines the zooplankton population will as well. This, in turn, will likely reduce the number and size of fish living in the lake (see Fig. 1). The Virginia Department of Environmental Quality (equivalent to California's State Water Resources Control Board) concluded that "gains in habitat from oxygenated hypolimnia and reduced macrophytes will likely be outweighed by loss of biological productivity" in reservoirs where significant nutrient reductions are sought.¹

¹ Virginia Department of Environmental Quality - Division of Water Quality Programs. Report of the Academic Advisory Committee on Freshwater Nutrient Criteria. July 20, 2004 @ pg. 68.

Fig. 1: Relationship between Chlorophyll-a and Fishery Condition



Source: Oglesby, R.T. 1977. Relationships of fish yield to lake phytoplankton standing crop, production, and morphoedaphic factors. *Journal of Fisheries*. Resource Board of Canada. 34:2271-2279.

The graph in Figure 1 is meant to be illustrative of the general relationship between algae and fish abundance. It is not meant to suggest the specific relationship that may exist in Big Bear Lake. It is included because we believe it is necessary to know define the relationship with greater certainty before concluding that the present algae concentrations may be impairing the beneficial use or assuming that lower algae concentrations will be "better" for the aquatic ecosystem in the lake.

- 1.4) The low dissolved oxygen concentrations measured in the deepest portion of the lake are caused by naturally-occurring anaerobic conditions. There is no specific evidence presented to determine the degree to which nutrient levels are exacerbating the problem. In particular, there is no evidence that the richness or abundance of fish is materially harmed by the ambient DO levels. Recent fish kills are relatively small and most likely due to extreme low lake levels and high water temperatures in the summer.

There is also no evidence to demonstrate that the DO objective will be met if the TMDL targets are achieved. We recommend that the draft TMDL be revised to determine if the alum application in 2004 had any measurable impact on DO levels. The draft TMDL should also recognize the presence of and analyze the effectiveness of a large-scale aeration project at the west end of the lake. The project is designed to increase dissolved oxygen concentrations without destratifying the lake and destroying the only cold-water refuge available in late summer. Recent data submitted to the Regional Board indicate the active remediation strategy is effectively mitigating the potential for DO impairment near the dam.

2.0 Comments Related to the Numeric Targets

- 2.1) If numeric targets will differ substantially from current water quality objectives for nitrogen and phosphorous in the Basin Plan, then those objectives should be revised in accordance with Section 13241 of the California Water Code. This is particularly true if the numeric targets are to be used as the basis for developing mandatory limits in NPDES stormwater permits.

In this instance, the proposed numeric targets are not merely "translations" of other existing water quality objectives in the Basin Plan. As noted above, the draft TMDL acknowledges that there are few problems with excessive algal growth in Big Bear Lake. Therefore, even if the nitrogen and phosphorous targets are intended to translate the narrative algae objective, the resulting Chlorophyll-a values should not be less than the current average ambient levels. And, unlike the current numeric objectives for nitrogen and phosphorous, there is no indication that the current DO objectives in the Basin Plan are somehow inadequate. Thus, there is no need to use translated targets to implement those numeric DO objectives.

We understand the reluctance to revise the nitrogen and phosphorous objectives; amending the Basin Plan is a difficult task. However, we believe the process is more scientifically credible and more publicly acceptable when the Regional Board adheres to the six factors identified in Section 13241. We are particularly concerned that the proposed targets should be evaluated with respect to whether they are realistically attainable given the natural background concentration of nitrogen and phosphorous of soils in and around Big Bear Lake.

- 2.2) The proposed numeric targets do not properly translate some of the relevant water quality objectives. For example, the narrative objective for algae states that:

"Waste discharges shall not contribute to excessive algal growth in inland surface receiving waters."

However, the proposed targets for nitrogen and phosphorous are not limited to waste discharges. They apply to all nitrogen and phosphorous loads regardless of whether it is a waste discharge or naturally-occurring. The same is true for total inorganic nitrogen. The Basin Plan states that the TIN objective:

*"...shall not be exceeded as a result of controllable water quality factors."
(pg. 4-9)*

The proposed numeric targets do not carry forward the requirement to distinguish between controllable and uncontrollable water quality factors. Therefore, they are an imprecise translation of the narrative objectives and should be considered new or revised water quality objectives in their own right (and subject to review under Section 13241).

- 2.3) There is considerable scientific uncertainty regarding the preferred percent coverage range for aquatic macrophytes. The draft TMDL recommends a target of 30-60% coverage based on general literature values. However, experts (Leidy, Smart, Remetrix) who have performed site-specific studies of Big Bear Lake recommend target values between 10-30%. We suggest that the target be revised to include the entire range (10-60%) until the discrepancy can be resolved. Alternatively, we advise that the target be restated as "approximately 30%" (the area of overlap between the recommended ranges).
- 2.4) It would be more effective and efficient to regulate water quality by developing biocriteria for Big Bear Lake. We should first decide what level of richness and abundance is desirable and attainable. Then we should estimate the nutrient levels needed to achieve that outcome. The proposed numeric targets, while intended to protect the aquatic ecosystem, are not closely correlated with any specific change in richness or abundance. More important, there may be other implementation strategies that can improve the density and diversity of aquatic species without attempting to manipulate water chemistry.

Chlorophyll-a, Secchi depth, percent macrophyte coverage, nutrient concentrations and the trophic state index are all indirect indicators of ecosystem health and integrity. We believe it is better to use more direct measures of the true biological endpoints we are most concerned with. It may be more difficult and it will undoubtedly cost more, but it is a more rigorous approach to assessing whether or not genuine impairment is occurring or not. Moreover, it will avoid misapplying generic values from the scientific literature to the unique aquatic ecosystem of Big Bear Lake.

- 2.5) Target levels should not be set to values less than that which can be achieved under undisturbed natural background conditions. According to the State Water Resources Control Board's draft Impaired Waters Guidance (3/2/05):

"It would be inappropriate, for instance, to adopt stringent source reduction measures for the ostensible purpose of protecting a beneficial use that natural background levels of pollutants would prevent achieving, and thus some sort of standards action is the only appropriate regulatory response." (pg. 6-5; see also the flow-chart on pg. 6-2)

The SWRCB guidance is consistent with the Santa Ana Regional Board's previous approach to addressing non-point pollution. For example, San Bernardino County's MS4 permit states:

"This order is intended to regulate the discharge of pollutants in urban storm water runoff from anthropogenic (generated from human activities) sources and is not intended to address background or naturally-occurring pollutants or flows."²

² Finding #13 in Order No. R8-2002-0012

We recommend that Regional Board calculate the natural background load that would occur by rerunning the WASP model after converting all existing land uses back to an undisturbed forest conditions for the simulation. In addition, it will be necessary to estimate the internal loads that were likely to be present in the valley soils when it was inundated after the dam was built. Nutrient loads in excess of these values might be deemed "waste discharges" because they do not occur under natural conditions.

We recognize that tolerating natural background loads may mean that the lake will not meet some of the proposed numeric targets. We view this as a natural limitation on the true potential beneficial uses that can be achieved rather than as an impairment of the existing beneficial use. In the end, it may be desirable to reduce nutrient loads below natural background levels. And, the people of California may decide to do so at some future date. However, it is not required in order to comply with either the Clean Water Act or the Porter-Cologne Act.

3.0. Comments Related to the Source Assessment

- 3.1) The source assessment does not distinguish between naturally-occurring and anthropogenic pollutant loads. For example, the ski resorts may contribute 4% of the total phosphorous loads during a wet year, however a large percentage of this was likely to have also occurred if the same acreage had remained undisturbed natural forest. The ski resort is only responsible for the incremental increase in load that comes as a result of their activities on the mountainside. Only that is a "waste discharge." The rest is a natural background issue.
- 3.2) The source assessment assumes that the existing Best Management Practices and other mitigation/remediation strategies have zero effectiveness. We know that to be untrue because the draft TMDL document relied on data of sediment captured in man-made retention ponds to calibrate some of the models. Thousands of tons of sediment are prevented from reaching the lake each year. In addition, thousands of tons of nitrogen and phosphorous were removed when BBMWD operated an active weed harvesting program. Similarly, the City of Big Bear Lake and San Bernardino County have comprehensive regulations designed to mitigate the potential adverse impact of development on storm water quality. It is scientifically inaccurate to perform the source assessment based on the false assumption that none of these programs exist or are effective.
- 3.3) The source assessment should be updated to include the critical information gained during the recent very wet winter of 2004-05. Such data is not only important to characterize the true fate and transport model for the watershed, it is essential to understand whether the dominant external sources are "controllable" or not as that term is used in Section 13241 of the California Water Code and in the Basin Plan itself.

- 3.4) The draft Technical Report indicates that there was insufficient information to calculate a TMDL for wet hydrologic conditions. If so, then this calls in to question the accuracy and reliability of the entire source assessment analysis. The absence of stream gauges, lack of high elevation weather station and dearth of suspended sediment data means the source assessment is not much better than a "best guess" at this point. In all likelihood, according to the testimony given by Ruth Villa Lobos (U.S. Army Corps of Engineers-LA District) the existing information is not good enough to meet the requirements imposed by CEQA and NEPA for obtaining 401 certification or 404 permits necessary to implement mitigation or remediation projects.
- 3.5) Some of the nutrient loads attributed to "Urban Point Sources" originated in the surrounding and are merely passing through the city's storm water infrastructure. Since the source assessment is likely to be used to establish regulatory responsibility, it is important to characterize the full fate and transport path more precisely. What originated as a naturally-occurring source of pollution is not legally converted to a "waste discharge" just because it ultimately arrived at the lake through a storm water drain rather than flowing across open ground. The storm water agencies are only responsible to the extent that their facilities increase the overall load ("waste discharge") beyond what would have otherwise occurred under natural conditions.

4.0 Comments Related to the Linkage Analysis

- 4.1) The proposed targets are not limited to dry hydrologic conditions only. The targets also apply to wet and average hydrologic conditions. Because the TMDL is limited to dry hydrologic conditions, it is impossible to make the demonstrations needed to show that attaining the targets will protect the designated beneficial uses.

It is inappropriate to assume that the uses will be protected under dry conditions unless we know that the targets will be met under average and wet conditions. More than 90% of the total nutrient load under dry conditions comes from sediment and macrophytes already in the lake. And, these internal loads are, in turn, the result of external loads delivered under much wetter hydrologic conditions. To assume that internal loads can be controlled under dry conditions without first characterizing the transport mechanisms that deliver the source material under wet conditions is scientifically unsound. To the extent that internal nutrient loads are the result of legacy pollutants contributed to the lake during wet years, those loads should be addressed in the wet weather TMDL rather than being included as part of the TMDL for dry conditions.

- 4.2) The linkage analysis should include a sensitivity analysis to assess the degree to which any of the assumptions may be driving the calculations. This is particularly important where the model indicates a minimum load reduction must occur in order to meet the required targets but the TMDL opts for a lower load reduction.³

³ See, for example, the discussion of macrophyte loads on page 79 of the Technical Report.

5.0 Comments Related to the TMDL Allocations

- 5.1) The draft Technical Report indicates that the "Responsible Parties" will be responsible for meeting the entire TMDL, including the internal load reductions. And, the Implementation Section states that the storm water permits will be revised to include new limits based on the Waste Load Allocation (WLA). However, the internal loads are assigned to the Load Allocation (LA) not the WLA. Therefore, it is unclear who is legally responsible for achieving the internal load reduction.
- 5.2) The proposed TMDL does not yet take into account the load reductions that have occurred as a cumulative result of all dredging activities over the last 30 years. Detailed records maintained by the BBMWD indicate that a net total of more than 500,000 cubic yards of sediment and nutrients have been removed from the lake since 1977. This is considerably more than the sum of all sediment inflows believed to occur during the same time. In addition, BBMWD harvested and removed more than 20,000 tons of weeds between 1991 and 2001. The alum application in 2004 sequestered many additional tons of nitrogen and phosphorous thereby preventing it from entering the water column. All of these activities must be shown in the TMDL allocation particularly as they relate to determining responsibility for the net internal load contribution.
- 5.3) The proposed TMDL does not yet account for the nutrient loads that were present in the soil when the valley was initially flooded to form the lake. This is a naturally-occurring source that is being improperly combined with all other sediments transported to the lake over the last 100 years.

If BBMWD's records are correct, then the net sediment and nutrient load to Big Bear Lake should be less now than at any time in the last 30 years. However, there does not appear to be any significant change in water quality over the same period of time. This indicates that the single most important factor driving nutrient concentrations in Big Bear Lake was present before the City of Big Bear Lake was incorporated, before the Big Bear Municipal Water District was formed and before the ski resorts were built. The nutrients were already present, in abundance, in the soils of the valley's marshy meadow that was destined to become the bottom of Big Bear Lake.

Core samples collected at the east end of Big Bear Lake in May of 2005 demonstrate that there is no clear trend in phosphorous concentrations with increasing sediment depth (see Fig. 2). Therefore, it is inappropriate to assign responsibility for internal loads to present day storm water permittees. For, even if those agencies were to remove 100% of the sediment that was deposited since the dam was constructed, it would likely only uncover more of the same lying beneath.

Fig. 2: Phosphorous Concentrations by Depth in Sediment Core Samples from East End

Sediment Depth	Site B-2	Site B-3
0 ft.	770 mg/kg	
-1 ft.		
-2 ft.		
-3 ft.		440 mg/kg
-4 ft.		
-5 ft.		910 mg/kg
-6 ft.		730 mg/kg
-7 ft.	1000 mg/kg	
-8 ft.	800 mg/kg	640 mg/kg
-9 ft.		
-10 ft.		
-11 ft.	990 mg/kg	460 mg/kg
-12 ft.	860 mg/kg	
-13 ft.		480 mg/kg
-14 ft.		
-15 ft.	340 mg/kg	

The data presented in Figure 2 is meant to illustrate the danger of assuming that phosphorous concentrations decrease as depth increases. It is unknown whether the data collected at the east end is representative of sediment conditions throughout the remainder of Big Bear Lake. However, the Army Corps of Engineers is engaged in a large-scale sediment sampling project designed to develop data to better characterize the greater lake. Results from that effort are expected to be available next year.

6.0 Comments Related to Seasonal Variations and Critical Conditions

- 6.1) We support the Regional Board's approach to distinguish between various hydrologic conditions. However, the distinction also bears directly on how targets should be established in the first place. The lake is incapable of achieving the same level of water quality under low pool conditions as it is under full pool conditions. We recommend that, just as the TMDL itself was divided into separate implementation tiers, different targets should be established for each of the major hydrologic condition (dry, average & wet). This would better account for the attainability and controllability issues the Board is obligated to consider.

- 6.2) The critical water quality condition occurs near the end of prolonged drought when lake levels, and available dilution, are at their lowest. However, the critical loading condition occurs during extreme wet ("El Nino") years. While we support developing different targets and different TMDLs for different hydrologic conditions, we recommend against attempting to adopt a TMDL for dry conditions and deferring development of the other TMDLs to a later (unspecified) time. Such a phased approach may waste considerable resources as agencies attempt to implement the dry weather TMDL only to discover, later, that the overall targets were never attainable due to uncontrollable factors intrinsic to average and wet weather conditions. Our recommendation is consistent with previous guidance prepared by the SWRCB's General Counsel:

*"Question: Can a TMDL be adopted by the Regional Board and incorporated into the Basin Plan with an understanding that an implementation [plan] would be adopted at some later specified or unspecified date? Answer: Theoretically speaking, a Regional Water Board could probably adopt a TMDL in two phases. That is, the Regional Water Board could first adopt the TMDL without an implementation plan, followed by adoption of an implementation plan at some later date. Although this is theoretically possible, it wouldn't make much sense for several reasons. First, under state law, an implementation plan is required. Consequently, the first basin plan amendment wouldn't be complete, and could not be implemented, until the later adoption of an implementation plan. Second, to the extent that the TMDL is not complete under state law, query whether this would meet the requirements of 303(d). Third, for the reasons explained previously, CEQA compliance would probably be more difficult because the Regional Water Board would have to identify and analyze all reasonably foreseeable methods of compliance with the TMDL in the first phase. Fourth, adopting the TMDL in phases would require the Regional Water Board to use its resources for two public adoption processes rather than one. Finally, adopting a TMDL without an implementation plan may raise 'clarity' issues for the Office of Administrative Law (OAL). OAL may determine that the TMDL cannot be approved under the rulemaking provisions of the Administrative Procedure Act because its impact on the regulatory community is unclear, without an implementation plan. In any event, any lengthy delay in adopting an implementation plan is unsupportable."*⁴

⁴William R. Attwater, Chief Counsel to the California State Water Resources Control Board. Memorandum to Gerard J. Thibeault, Executive Officer of the Santa Ana Regional Board entitled: "Do TMDLs Have to Include Implementation Plans" March 1, 1999 (pg. 9)

We understand that the proposed Implementation Plan fully implements the proposed TMDL for dry weather conditions. However, it does not assure continuous compliance with the proposed targets which do not distinguish between wet and dry hydrologic cycles. Therefore, this is clearly a phased or tiered implementation plan. To demonstrate good faith, we are prepared to go forward with the most substantial elements of the Implementation Plan (monitoring, modeling, plan preparation) voluntarily while the Board staff continues to develop the TMDLs for average and wet conditions. BBMWD is preparing a formal work plan to update and upgrade their Lake Management Plan to facilitate the proposed TMDL Implementation Plan.

7.0 Comments Related to the Implementation Plan

- 7.1) The proposed Implementation Plan is insufficiently complete to assess the real-world requirements associated with meeting the recommended targets. For example, item #2 in Section 9.1 of the Technical Report states that

"The Regional Board will review and revise, as necessary, the existing NPDES permits to incorporate appropriate WLAs, compliance schedules and monitoring program requirements." (pg. 91)

It is necessary to know the exact nature of such permit limits in order to assess all of the potential impacts associated with building the facilities or implementing the programs necessary to assure compliance. Since revised permit limits are a "reasonably foreseeable" result of adopting the TMDL, the Regional Board is obligated to consider the specific effects of doing so. As before, it is improper to separate the impact analysis into distinct sub-phases and defer it to a later time when it is evident at the time the TMDL is adopted that the subsequent phases are likely or inevitable (see CEQA discussion below).

- 7.2) The proposed Implementation Plan does not provide a thorough environmental analysis of the means most likely to be used to reduce internal nutrient loads. A general list of options (dredging, alum, native plant species) is given, but a much more detailed review is necessary to demonstrate reasonable assurance that the targets will be attained and to comply with CEQA. For example, alum applications have been shown to be very effective at reducing phosphorous flux from the sediment. However, water quality samples collected during the previous alum application project indicate that the ambient aluminum concentrations in Big Bear Lake already exceed relevant water quality objectives. There is no assimilative capacity for additional aluminum. Therefore, if alum is likely to be used, it will be necessary to revise the water quality objectives or to approve a temporary variance. Without such regulatory modifications, it would be illegal to use alum as a strategy for meeting the proposed TMDL. And, as noted in comment #5.3 (above), one should not assume that compliance can be assured by dredging either.

- 7.3 We strongly support the Regional Board's proposal to develop and issue a general NPDES permit for restoration activities in Big Bear Lake. It will greatly facilitate BBMWD's on-going efforts to improve water quality and protect beneficial uses in the lake. We believe the proposed general permit will be considerably more effective if many of the CEQA demonstrations are integrated into the general permit at the time it is adopted. That is why we believe it is essential that the proposed Implementation Plan identify the specific compliance strategies envisioned, do the requisite environmental review, and make the findings necessary to support rapid execution of various mitigation and remediation projects.

8.0 Comments Related to Economic Considerations

- 8.1) The analysis of economic impacts is incomplete because the Implementation Plan is just a vague outline of potential options. The economic costs cannot be evaluated until the specific implementation requirements are identified. Under the California Supreme Court's recent Burbank decision, the Regional Board must do that at the time the TMDL is adopted because economics need not be considered at the time permit limits are enacted.
- 8.2) Much of the economic analysis is presented in unit costs (e.g. cost per sample or cost per acre). That is not adequate to evaluate the cumulative effect. How many samples, in how many locations, over what period of time and for what chemical parameters must be analyzed? Table 11-2 on page 97 of the Technical Report indicates that dredging two feet of sediment from a single acre may cost between \$15,000 and \$50,000. This does not include the cost to haul the material to a suitable disposal site which will add \$75-\$100/ton.

It is not evident from the unit cost data what the total probable cost will be to attain and maintain compliance with the proposed targets. For example, dredging just 200,000 cubic yards of sediment out of the east end cost \$5-6 million. The total cost was manageable because the sediment was used to cap a local landfill just a few miles away. Without a nearby disposal option, such a project would have been beyond the means of the local sponsors. Finally, no costs shown for alternative methods of increasing the richness and abundance of aquatic organisms (such as supplemental fish stocking).

- 8.3) The City of Big Bear Lake and surrounding area has fewer than 15,000 full time residents. The median household income is less than \$30,000 year and the entire valley is classified as a Disadvantaged Economic Community by the state of California. The combined budget of the BBMWD and the City is only about \$12 million/year. Even if 100% of both budgets were earmarked to meet the TMDL targets, there would not be sufficient resources to reduce internal loads by 80% if dredging were the only legal alternative. And, it is very difficult to pass the cost-of-compliance on to the several million people who visit Bear Valley each year. The economic analysis must include a more realistic assessment of total cost, the means by which it will be paid, and the socioeconomic impact on this relatively poor rural community.

- 8.4) The tabular summary of expenditures to improve water quality in Big Bear Lake creates a false impression that state grants are the only significant investment occurring. On the contrary, state grant funds represent a very small percentage of the total costs borne by local stakeholders to protect the lake. Many millions of dollars are budgeted each and every year to maintain and protect the lake. For example, state grant funds paid less than one-third of the cost of the east end pilot dredging project, less than half of the Sonar application cost and less than half of the lake-wide alum application project. In addition, the U.S. Army Corps of Engineers has spent more than \$1 million conducting a comprehensive investigation of Big Bear Lake and will spend nearly \$3 million more before their study is complete. Their purpose is to identify and design specific project to restore the aquatic ecosystem of Big Bear Lake to its full potential.

Members of the TMDL Task Force are extremely grateful for the grant assistance provided by the Regional and State Water Boards. However, we believe it is very important to document the full scope of investments made by all stakeholders (local, state, federal, public and private) so that it is clear that no one is attempting to avoid their rightful responsibilities to the lake and surrounding watershed. BBMWd will prepare and submit a financial summary of the previous expenditures under separate cover.

- 8.5) While some of the initial costs of implementing an in-lake monitoring program and watershed-wide nutrient monitoring program are covered by state grant funds, it is unclear how long these programs will continue. State grants will expire in just two years. Beyond that, the Technical report indicates that costs will be borne by the responsible parties. That effort may absorb much of the local budgets that are presently earmarked to do actual lake improvement projects. Therefore, we beseech the Board to consider carefully the value of each and every monitoring mandate or study requirement. We must be careful that scarce resources are not diverted from worthwhile remediation and mitigation projects toward less productive efforts.
- 8.6) If the targets are set to a level that necessitates reducing nutrient loads below natural background concentrations, then the TMDL is imposing requirements more stringent than necessary to comply with federal regulations. We recognize that the Regional Board has authority to do so, however, the California Supreme Court recently ruled that a new economic analysis may be required in such instances. There is no evidence in the record to suggest that the economic consequences of reducing ambient background concentrations was contemplated or considered at the time the narrative or numeric objectives were previously adopted in the Basin Plan.
- 8.7) Finally, some of the projects that may be required to meet the proposed targets (esp. dredging) may seriously undermine the aesthetic appeal of the lake. Given the length of time required to complete such large-scale remediation efforts, these projects may significantly reduce tourism to the area and undermine the financial health of the local economy. It is very important that the Implementation Plan be more detailed so that the economic costs of compliance can be assessed and the indirect economic consequences of mitigation and remediation can be evaluated.

9.0 Comments Related to CEQA

- 9.1) Although the Basin Planning process has been deemed "functionally equivalent" to the preparation of an Environmental Impact Report, that is true only if each of the relevant CEQA elements is adequately addressed during the workshops and hearings. In this instance, CEQA would likely require a programmatic EIR:

"Where individual projects are, or a phased project is, to be undertaken and where the total undertaking comprises a project with significant environmental effect, the lead agency shall prepare a single program EIR..." (CEQA Guidelines §15165)

The draft Technical Report incorrectly asserts that full CEQA review can be deferred until specific mitigation projects are proposed at some future date. Once again, the California Supreme Court has advised otherwise:

"...an EIR must include an analysis of the environmental effects of future expansion or other action if: (1) it is a reasonably foreseeable consequence of the initial project and (2) the future expansion or action will be significant in that it will likely change the scope or nature of the initial project or its environmental effects."⁵

This is also consistent with the guidance previously provided by the SWRCB's General Counsel (refer to excerpt cited on page 10 of this comment letter). Therefore, to comply with CEQA, the TMDL must identify and thoroughly evaluate the potential environmental consequences of all reasonably foreseeable implementation strategies that would likely be used to achieve compliance with the proposed targets. The current Technical Report merely lists the various compliance options while providing no detailed environmental analysis.

- 9.2) The draft Technical Report does not identify or discuss all of the reasonable alternatives to the proposed project.⁶ Reasonable alternatives must be considered "even if these alternatives would impede to some degree attainment of the proposed objectives."⁷ Some of the reasonable alternatives not mentioned in the draft Technical Report include: setting nutrient targets equal to the ambient natural background loads, improving richness and abundance by increased stocking, alternatives to the proposed TSI, subcategorizing the beneficial uses to recognize natural limitations, and/or conducting a Use Attainability Analysis. Reasonable alternatives may also include using biocriteria rather than nitrogen and phosphorous targets to regulate nutrient levels in the lake or using Beneficial Use Maps to zone the lake to protect some uses in one place and other, competing uses, in other places.

⁵ Laurel Heights Improvement Association v. U. of California, 47 Cal.3d, 376, 396 (1988)

⁶ Wildlife Alive v. Chickering, 18 Cal. 3d 190, 197 (1976) reaffirmed in Laurel Heights @ 400.

⁷ CEQA Guidelines §15126(d)(3)

The draft Technical report asserts that other alternatives need not be considered because the proposed targets provide the best assurance that the narrative water quality objective for algal growth will be achieved and that beneficial uses will be protected. Even if true, CEQA requires more. It requires an analysis of other alternatives that are not necessarily "best" at achieving the lead agency's primary objectives.

- 9.3) The CEQA Checklist is inaccurate. It appears the draft checklist was prepared after considering only the immediate and direct impacts of amending the Basin Plan to include text related to the proposed TMDL. The checklist does not appear to have taken into consideration any of the reasonably foreseeable follow-on activities that will become legally-binding obligations once the TMDL is adopted despite acknowledging that:

"The Basin Plan amendment includes an implementation plan that details the actions required by the Regional Board and other responsible parties for implementing the TMDLs."⁸

For example, the draft checklist states that the proposed action would not violate any water quality standards.⁹ However, the Implementation Plan indicated that additional alum treatments may be necessary to meet the recommended targets. As noted earlier, data collected during the previous alum application program indicates that similar remediation programs in the future would likely violate the current water quality objective for aluminum in the Basin Plan. Therefore, the claim of "No Impact" does not accurately represent the reasonably foreseeable consequences of adopting the proposed Basin Plan amendment. There are several other places throughout the checklist that should be revised to reflect that potentially significant impacts will occur and that mitigation will be necessary.

10.0 One final concern...

The draft Technical Report repeatedly refers to some stakeholders as "Responsible Parties." In context, this term appears to identify the specific agencies and organizations that the Regional Board believes have a legal obligation to implement the TMDL and assure that the numeric targets are achieved. We recommend against using this particular phrase. The Clean Water Act and the Porter-Cologne Act provide the Regional Board authority to regulate "waste discharges" and, "waste dischargers." Therefore, phrase "Responsible Party" comes from CERCLA (Superfund) legislation and has a much broader meaning than does the term "waste discharger." Historically, neither the Clean Water Act nor the Porter-Cologne Act has interpreted naturally-occurring pollutants as "waste discharges" even where those substances may be impairing or limiting beneficial use attainment. The phrase "Responsible Party" is useful when discussing a groundwater plume but it merely confuses the issue when applied to natural conditions.

⁸ See item #I-8 on pg. 1 of Attachment B: Environmental Checklist

⁹ See item #VIII-a on pg. 6 of Attachment B: Environmental Checklist



United States
Department of
Agriculture

Forest
Service

San Bernardino National Forest
Supervisor's Office

1824 S Commercenter Circle
San Bernardino, CA 92408-3430
Phone: 909-382-2600
Fax: 909-383-5770
TTD: 909-383-5616

File Code: 2500/2520

Date: August 31, 2005

Heather Boyd
Environmental Scientist
Santa Ana Regional Water Quality Board
3737 Main Street, Suite 500
Riverside, CA 92501-3348

Ms. Boyd,

Thank you for allowing the San Bernardino National Forest the opportunity to review the "Staff Report on the Nutrient Total Maximum Daily Loads for Big Bear Lake" and the "Staff Report on the Sediment Total Maximum Daily Loads for Big Bear Lake and Rathbun Creek." We look forward to working with you during the evaluation of these comments, providing any clarification you would need. We would appreciate a full and complete review of the provided comments. Though some comments are specific to the sediment TMDL, which was 'pulled' from consideration on August 26, 2005, we would still appreciate replies in that some of the information from the sediment TMDLs is likely to be incorporated into the nutrient TMDL. Please contact Robert Taylor, Forest Hydrologist, 909-382-2660, with any concerns.

CRWQCB - REGION 8	
RECD	DATE
	SEP 01 2005
HAS	9/6
HMB	
JES	MAS CC

Sincerely,


for GENE ZIMMERMAN
Forest Supervisor

cc: Jon Regelbrugge, Douglas Pumphrey



“N” refers to “Nutrient” for comment references.

N01 Section 2.0, Page 27, ¶ 2: The TMDL does not refute the Leidy (2003) report stating that the reservoir is naturally eutrophic. Therefore, use of the arbitrary TSI value of 47 is not justified [see comment regarding TSI, Attachment C].

N02 Section 2.0, Page 29, ¶ 2: Has the amount of phosphorous sorbed to sediment loading considered background been taken into account such that phosphorous sorbed to background sediment is considered background phosphorous and is not included in the amount of phosphorous for possible reduction? Numerous publications have defined the natural background levels of phosphorous expected from a forested ecosystem [see below]. These levels of phosphorous should be defined as background and only the increment above these levels should be considered for reduction.

- Binkley, D., Ice, G., Kaye, J., and C. Williams. 2004. Nitrogen and Phosphorus Concentrations in Forest Streams of the United States. *Journal of the American Water Resources Association (JAWRA)* 40(5) 1277-1291. & Binkley, D. 2001. Patterns and Processes of Variation in Nitrogen and Phosphorous Concentrations in Forested Streams. National Council for Air and Stream Improvement. Technical Bulletin No. 836.
 - Survey of 300 streams in watersheds of 1 to 2500 acres
 - West: NO₃ comprises 30% of western nitrogen source; dissolved organic N is 60%
 - 90 Western forest streams (N as NO₃⁻): mean 0.20 mg N/L, median 0.03 mg N/L
 - 6 Western forest streams (N as DON): mean 0.44 mg N/L, median 0.50 mg N/L
 - P and NO₃ concentrations in streams draining hardwood forests exceeded those for streams draining coniferous forests in each region by 2 to 3 times, but DON in conifers exceeds hardwood by 3 to 8 times
 - 47 Western forest streams: Inorganic P: mean 8 ug P/L, median 3 ug P/L
 - In 43 harvesting experiments, unlogged 0.21 mg N/L versus 0.44 mg N/L for 3 to 5 years following logging – not statistically significant with ANOVA, also phosphate does not increase statistically.
 - Williams and Melack (1997) found significant increases in stream water NO₃ concentrations following prescribed fires in mixed conifer forests of the Sierra Nevada in California.
 - (1) N increased 5-10 times in first 2 years following fire, returned to background in 4th year
 - (2) Similar results reported in Schindler et al. (1980) & Spencer (1998)
 - Wright (1976) & Tiedemann et al. (1978) studied inorganic P following wildfire, seeing increases of 3 times above background
- Thomas Meixner, Mark E. Fenn, Peter M. Wohlgemuth; Fire Disturbance and Nitrogen Deposition Impacts at the Watershed Scale in Southern California
 - San Dimas Experimental Forest (SDEF): atmospheric deposition (~35 kg ha⁻¹ year⁻¹), precipitation, prescribed fire effects from 1984
 - Export as well as VWM concentrations increase dramatically in wet years and are orders of magnitude lower in dry years. This inter-annual variability in export that is dependant on precipitation as well as antecedent conditions indicates that there is a hydrologic control on nutrient export from chaparral catchments.

- Kent, R. and Belitz, K. 2004. Concentrations of Dissolved Solids and Nutrients in Water Sources and Selected Streams of the Santa Ana Basin, California, October 1998–September 2001. USGS Water-Resources Investigations Report 03-4326.
 - Reference streams in Santa Ana Basin, including the South Fork of the Santa Ana River, draining into Bear Creek, were established. Reference condition for mountain sites established as 0.02 mg/L total phosphorous. This study, conducted by the U.S. Geological Survey as part of their National Water-Quality Assessment program, included monitoring at sites receiving wastewater, urban runoff and groundwater discharge, and runoff from the San Bernardino and San Gabriel mountains. The mountain sites receive much of their runoff from USFS lands that are managed according to the same practices as those in the San Jacinto Basin (e.g., USFS Best Management Practices). Phosphorus concentrations at these sites were very low. They rarely exceeded the U.S. EPA's reference criterion of 0.03 mg/l and their general goal level of 0.1 mg/l. In contrast, many downstream sites had concentrations that were orders of magnitude higher and that generally exceeded EPA's guidelines.
- The USFS review of published nutrient export rates from forested environments throughout the U.S identified several high quality sources of data, including the most comprehensive syntheses ever published on the topic (Binkley et al. 2004 and NCASI 2001). This information was used to compare current nitrogen and phosphorus export rates from forest and open space areas in the Big Bear watershed to median and average export rates from forests throughout the U.S., forests in the western U.S., and forests in Southern California. Comparisons were also made to the Environmental Protection Agency's (EPA 2002) proposed nutrient criteria for western forested mountains
- Based on these comparisons and the fact that changes in land use (from forest to agriculture or urban use) appear necessary to substantially increase nutrient concentrations in higher order streams (Binkley et al. 2004), the USFS believes that NFS lands in the watershed are functioning relatively naturally with respect to nutrient export. We believe that our scarce resources should be utilized to address demonstrated water quality problems and threats to water quality, such as catastrophic wildfire.

N03 Section 2.0, Page 30, ¶ 1; Tables 2-1, 2-2, and 2-3: The statistical analysis performed was incorrect relative to non-detects. Using ½ the detection limit is only applicable for certain distributions of data and then only when the number of non-detects is on the order of 15-25% of the population. The analysis should be redone given the information and references below. If insufficient data is available to draw conclusions, then the tables should not list results or should have results footnoted to show that data issues make conclusions questionable.

- "Nondetects and Data Analysis", Helsel, 2004. (<http://www.practicalstats.com/nada/>) explains the statistical methods needed when multiple detection limits are encountered as well as when greater than 25% of the data set are non-detects.
- For Table 2-1, 13/18 samples were non-detect. The resulting average and median values provided are not statistically defensible given current scientific understanding.
- Table 2-2 shows that only 4 samples were taken. This is an insufficient dataset from which to draw conclusions.
 - The U.S. Environmental Protection Agency (EPA 1992) asserts that there must be 8 to 10 independent samples before one can generate a passable estimate of the

population standard deviation for populations having normal or lognormal (parametric) distributions. In situations where a seasonal trend is present within the data set, the Seasonal Kendall Test requires a minimum of three years of monthly data or 36 data points (Gilbert, 1987, p.225). Harris et al. (1987) state that one is unlikely to be able to quantify serial correlation (independence) in quarterly ground water data without at least 10 years of quarterly data, or 40 data points. When there are fewer than 12 identifiable seasons, such as with quarterly data, the Kruskal-Wallis Test can be used as long as there are at least three years of data taken in the same months or 12 data points.

- Table 2-3 shows 135/144 non-detects of Total P data. Using $\frac{1}{2}$ the detection limit is an incorrect method. The resulting average and median values provided are not statistically defensible given current scientific understanding.

N04 Algae, Page 40, ¶ 2: In regards to the “personal observation,” was the person making the observation trained and/or have the documented expertise to make an accurate observation? Also, the sentence references “accounts” plural, yet the parenthetical notes “personal observation” singular. Please clarify.

N05 Page 41, Table 2-7: See previous statistical comment (N03) related to percent non-detect and number of samples required to make a statistical conclusion that will meet the assumptions inherent in data analysis. Specifically, years 1993 (2 samples), 1994 (4 samples), and possibly 1998 (8 samples) may have insufficient populations for conclusions to be drawn.

N06 Pages 44-45, Figures 2-4 and 2-5: Please provide the statistical tests showing a significant difference between these two data sets as discussed in the preceding ¶ (“experiences less pronounced dissolved oxygen stratification”).

N07 Pages 47-51, Sections 3.1 and 3.1.1, Table 3-1

- 1) The targets, as presented, appear to apply at all times, not just in dry years. Given that the target of 35 ug/L was determined from an estimate at the 25th percentile of dry year data, setting of this as the long range target is irresponsible. What if the next five years are not dry? These numeric targets should be proposed as “dry year” targets (and the title of Table 3-1 changed appropriately) with a note that every 3 years, the data will be re-assessed and new targets based on the 25th percentile of the data will be quantified.
- 2) The approach that results in the final target of 20 ug/L (“a trophic index system was used to derive the final numeric targets” [Page 49, ¶2] is not based on the data, but rather an assessment of the Carlson Trophic State Index, which was derived by studying small lakes in Minnesota. The explanation in Appendix C is incomplete in its explanation. The use of the Carlson Trophic State Index as applicable to a reservoir that is not contained within the dataset used to derive the index is an unproven assumption. The information provided below should be assessed or added to Appendix C and further justification of the use of the Carlson Trophic State Index for this situation should be assessed.
- 3) **Section 3.1.1, Page 50, Numeric Targets, ¶ 2:** The statement is made that a Carlson TSI of 47 is “on the high end of the mesotrophic level.” The table below indicates that the mesotrophic TSI range for small Minnesota lakes is 40 to 60. The SBNF would like the

report to contain language indicating that the Carlson TSI was derived using data of small Minnesota lakes, which may or may not be applicable to Big Bear Lake. In addition, the comment related to the “high end” should be removed.

- 4) Ke-Sheng Cheng and Tsu-Chiang Lei, 2000, Reservoir Trophic State Evaluation using Landsat TM Data; Agricultural Engineering Department / Hydrotech Research Institute, National Taiwan University, Taipei, TAIWAN
<http://www.gisdevelopment.net/aars/acrs/2000/ts2/water0006pf.htm>
 Ranges of Chla, TP, and SDD measurements in Taiwan's reservoirs are generally much larger than that of Minnesota's lakes which original TSI model was developed. In addition, using the Carlson method, these researchers determined separate equations.

Carlson's equations for Minnesota lakes.

$TSI(SDD) = 10(6 - \frac{\ln SDD}{\ln 2})$	(1)
$TSI(Chla) = 10(6 - \frac{2.04 - 0.68 \ln Chla}{\ln 2})$	(2)
$TSI(TP) = 10(6 - \frac{\ln(48/TP)}{\ln 2})$	(3)

the following modified TSI model was developed for Te-Chi reservoir:

$TSI(SDD) = 10(8.605 - \frac{\ln(SDD)}{\ln(1.544)})$	(4)
$TSI(Chla) = 10(8.605 - \frac{1.8571 - 0.3264 \ln(Chla)}{\ln(1.544)})$	(5)
$TSI(TP) = 10(8.605 - \frac{2.1775 - 0.4230 \ln(TP)}{\ln(1.544)})$	(6)
$\overline{TSI} = (TSI(SDD) + TSI(Chla) + TSI(TP)) / 3$	(7)

TSI cutoff values for Taiwanese reservoirs are 0:52 for oligotrophic, 53:60 for mesotrophic, 61:65 for meso-eutrophic, 66:77 for eutrophic, and 78:100 for hypereutrophic.

Comparison of Trophic State Index to Water Quality Parameters and Lake Productivity				
Trophic State	TSI	Secchi Disk (m)	Total Phosphorus (µg/L)	Chlorophyll <i>a</i> (µg/L)
Oligotrophic	0	64	0.75	0.04
	10	32	1.50	0.12
	20	16	3	0.34
	30	8	6	0.94
Mesotrophic	40	4	12	2.60

	50	2	24	6.40
Eutrophic	60	1	48	20
	70	0.500	96	56
	80	0.250	192	154
	90	0.120	38	427
	100	0.062	768	1,183

(NOTE: The original source of this table is Carlson, R.E. , 1997. A Tropic State Index for Lakes. *Limnology and Oceanography*, 22:361-369.)

- 5) Report for 2001CO1761B: Applicability of Trophic Status Indicators to Colorado Plains Reservoirs; <http://water.usgs.gov/wrri/01grants/prog-compl-reports/2001CO1761B.pdf> Although the Carlson TSI offers the advantage of retaining information about the system, there are several reasons why it may not be appropriate for the reservoirs of Colorado
- 6) EPA-822-B00-001
<http://www.epa.gov/waterscience/criteria/nutrient/guidance/lakes/chapter2.pdf>
 Probably the most sophisticated of the multivariate indices is that of Brezonik and Shannon (1971), which uses principal components analysis to derive a trophic state index (TSI) based on seven variables: (1) TP, (2) primary production, (3) inverse of Secchi depth, (4) total organic nitrogen, (5) chlorophyll *a*, (6) specific conductance, and (7) the inverse Pearsall cation ratio ($[\text{Ca}]+[\text{Mg}]/[\text{Na}]+[\text{K}]$). Other less sophisticated indices generally combine unweighted variables by one means or another. The EPA Index (U.S. EPA, 1974) ranked lakes based on “the percentage of the 200+ lakes exceeding Lake X in that parameter”; the index was “simply the sum of the percentile ranks for each of the parameters used.” The variables used were TP, dissolved phosphorus, inorganic nitrogen, Secchi depth (500-Value [inches]), chlorophyll *a*, and minimum dissolved oxygen (15-DOmin).
 - 7) Summary Comment: The study of the Taiwan reservoir produced TSI equations that were different than the Carlson TSI equations developed for small lakes in Minnesota. Likewise, the TSI values defining oligotrophic, mesotrophic, and eutrophic conditions vary as well. The report regarding Colorado Plains reservoirs also indicates limitations of relying on the Carlson TSI when looking at water bodies different from the small Minnesota lakes of the original data set. Even EPA’s Nutrient Criteria for Lakes and Reservoirs (EPA-822-B00-001) indicates that there are multiple indices that can be used given the data set and the type of water body being measured. These differences indicate that using Carlson’s TSI equations for a setting away from small Minnesota lakes is fallible.
- **8) Section 3.1, Page 49, ¶ 2:** The “third approach” cited and the last sentence of the paragraph starting “Specifically” does not fully describe the method as presented in EPA-822-B00-001. The final sentence should more fully describe the method, “There are two approaches: (1) using the morphoedaphic index method (MEI) and (2) extrapolating natural background nutrient loading that would occur under undisturbed conditions followed by estimation of nutrient concentrations and trophic state with a mass balance model.”

- **9) Section 3.1, Page 49, ¶ 2:** Was the “third approach” used by EPA to determine a value of 20 ug/L, as referenced on Page 50, Section 3.1.1, ¶ 2? If so, this should be documented. If not, then the documentation of the method used should add that the final target did not use the third approach as stated.
 - SBNF Suggestion: Therefore, the SBNF suggests that the current final target for total phosphorous in dry years be set using the lower 25th percentile of the data, listed as 31 ug/L, instead of 20 ug/L. Please reference comment **N34**, which discusses the statistical analysis that was used to determine the value of 31 ug/L.
 - **10) Section 3.1, Page 48, last sentence before Figure 3-1:** Setting dates to meet final targets is premature given that erosion of sediment and associated nutrient loading will be increasing in the short term to return the forest to a more natural fuel loading condition. In addition, if the next few years continue to be wet, targets based on dry year data are unlikely to be correct or achievable.
 - **11) Section 3.1, Page 49, ¶ 2:** The 25th percentile calculates to 31 ug/L, not 35 ug/L. The report should note the difference here, not just in footnote 27.
 - **12) Page 50, Table 3-2:** This Table has no use in the report. This method is not used, and the data in the table was derived with no data from Southern California Mountains subecoregion. The Table might make it seem to some that a target of 20 ug/L is reasonable since it is more than twice the value in Table 3-2. Since the data set is not appropriate for Big Bear Lake, the implication raised by the table shouldn't occur. Please remove this table.
 - **13) Section 3.1.1, Page 50, ¶ 2:** A statement is made that “EPA considers the dividing point between mesotrophic and eutrophic conditions” is 20 ug/L, yet the reference is a textbook, not an EPA document. Please provide the reference to the appropriate EPA document.
- N08 **Section 4.0, Page 53, ¶ 2 and Section 6.0, Page 84, ¶ 5:** The effect of channelization and the loss of floodplain deposition should be more fully addressed. Sediment originating from the forest that in the pre-anthropogenic setting would have been deposited on the floodplain, now more likely reaches Big Bear Lake. Is this increase in sediment to the Lake assigned to the agency responsible for altering the stream channel? To state that the urban contribution is entirely encompassed by a waste load allocation (as in Table 6-1 and 6-2) discounts the increased contribution to the lake from the lack of floodplain deposition. This source of increased loading should be quantified or modeled and a portion of the load allocation should be transferred to the responsibility of the urban stakeholders.
- N09 **Section 4.0, Page 53, ¶ 5:** A more thorough analysis of Plunge Creek needs to be added to show that it is adequate as a model for the hydrology of the Big Bear Lake watershed.
- N10 **Section 4.0, Page 54, ¶ 2:** As stated in comment N03, variable detection limits and non-detects can still be evaluated for useful information. A more thorough statistical analysis should be conducted before stating that “phosphorous detection limits were too high.”
- N11 **Section 4.0, Page 54, ¶ 2:** The ***bold, italic*** statement needs to be reiterated on page 47 in conjunction with Table 3-1. This statement gives further justification for making the targets dry year targets only.

- N12 **Section 4.0, Page 54, footnote 30:** Please clarify. Was the inability to use the WASP model for the entire data range due to a problem with the format of the output given to the RWQCB? If so, the stakeholders should not be penalized (forced to meet targets based on inadequate data) because the RWQCB had difficulty with the contractors. Why didn't the RWQCB get the output required from the HSPF model for the WASP model before setting targets?
- N13 **Section 4.0, Page 55, ¶ 1:** In making the determination between low and high water holding capacity, who made the determination and how was it made? Was the practitioner a trained soil scientist? What soils dataset was used? As the soil survey gives descriptions of water holding capacity beyond high and low (e.g. DaF is very low), how were the varying groups placed in the two categories?
- N14 **Section 4.0, Page 55, ¶ 3 and Section 6.0, Page 85, Tables 6-1 and 6-2:** Was an assessment made as to whether the flow data fit a normal distribution, a lognormal distribution, or a nonparametric distribution? The type of distribution has implications on the analysis performed, the amount of data needed to adequately address the distribution, and the setting of averages. There is also the implication that the high flow years will deposit the most nutrients in the lake. If the final targets are "specified as an annual average", then the RWQCB is possibly setting up the stakeholders for failure since high flow years are the hardest to control movement of sediment and nutrients.
- N15 **Section 4.0, Page 55, Figures 4-3 and 4-4:** The targets are based on dry years, but these Figures show the high variability associated with nutrient loading. The real variability must be taken into account when setting the targets. In addition, as the phosphorus has been associated with "granitic sand" the final targets must take into account that a large percentage of the phosphorus is associated with background erosion. This natural background phosphorus should be classified appropriately, and a calculation of the internal load associated with this natural background should be identified in Table 4-2 (Page 60) and Tables 6-1 and 6-2 (Page 85). The SBNF should not be held liable for the phosphorus that would naturally erode with the background sediment.
- N16 **Section 4.0, Page 58, ¶ 2; Section 4.0, Page 59, ¶ 1; Section 4.3, Page 62, ¶ 2:** The statements that "runoff from forest areas contributed 10% of the total nitrogen load and 26% of the total phosphorus load" and "the most significant contributions from forest land use" need to be clarified. The percentage of each nutrient associated with natural background erosion needs to be quantified and listed. Loading beyond natural background could then be better established for the various stakeholders.
- N17 **Section 4.3, Page 62, ¶1 & Section 2.0, Page 27, ¶ 1:** The statement is made (Section 2.0, page 27) that "lakes naturally take thousands of years to progress from an oligotrophic condition ... to an eutrophic condition." The valley had thousands of years to build up sediment and nutrients prior to the arrival of humans and the building of the dam. Has the RWQCB taken into account that the lake bottom sediments deposited before the Forest Service was created are not the responsibility of the Forest Service? Also, has the RWQCB

determined what chance there is that the oligotrophic condition could ever be approached given the hundreds of feet of sediments that are naturally occurring in this watershed?

- N18 **Section 4.5, Page 67, ¶ 3:** It is inaccurate to state, “phosphorus loading to Big Bear Lake during a wet year” without adding a reference to 1993. Without the year reference, the implication is that the statement and the associated loading will be accurate for all wet years.
- N19 **Pages 69-70, Figures 4-6 and 4-7:** The labels next to the pie charts should encompass the years used in case, in the future, the charts are ever looked at without the accompanying figure text.
- N20 **Section 5.1, Page 72, carryover ¶ and Section 5.1b, Page 76, carryover ¶:** An acknowledgement should be made that the load targets may not be possible to meet. The RWQCB only states that compliance is not achieved because of “model limitation” “incomplete understanding” and “model deficiency.” The possibility exists that the targets cannot be met given the natural condition of the lake bottom and watershed (see N17).
- N21 **Section 5.1a, Page 72, ¶ 1:** The final sentence of this paragraph defining what dry conditions are should be copied/reiterated near Table 3.1 in conjunction with the statements that the targets were derived for dry years only.
- N22 **Section 5.1a, Page 72, ¶ 1:** The second sentence needs to acknowledge that the “external nutrient loads are greatest” post-fire and that fire is a natural background condition for this watershed.
- N23 **Section 5.1b, Page 76, carryover ¶:** The “extended compliance schedule” of 10 years is likely inadequate. Three to four years will likely be spent collecting sufficient data to calibrate the model. If reductions are required, then it will take, at a minimum, an additional three years to begin to calculate if a downward trend exists. Given the variability of results for different hydrologic years, it is unlikely that 10 years will be adequate to meet a final target.
- N24 **Section 5.1d, Page 77, ¶ 2 & 3:** The report should note that the studies performed by Welch and Cook (1995) and Welch and Jacoby (2001) were for shallow lakes and western Washington lakes, respectively. The applicability of these studies to Big Bear Reservoir has not been shown, and this possible lack of applicability should be acknowledged. In addition, the RWQCB should address what the environmental consequences of alum application are relative to any water quality objectives for aluminum.
- N25 **Conclusions, Page 79, ¶ 3:** Has the RWQCB made a determination of how an 80% reduction in phosphate sediment flux is to be achieved given the natural condition of the watershed (e.g. several hundred feet of sediment forming the lake bottom) [see N17]?
- N26 **Page 80, Table 5-1:** Based on our comments in N07, if the final target is set to 31 ug/L instead of 20 ug/L, then it seems possible that a scenario could be found to simulate a successful target acquisition.

- N27 **Page 83 & 85, Tables 5-2, 5-3, 6-1 and 6-2:** As each of these tables specifically reference that these nutrient TMDLs are associated with dry conditions, then Table 3-1 (page 47) should also explicitly be for dry conditions (see comment N07, 1).
- N28 **Section 6.0, Page 84, ¶ 3:** The final sentence implies that the stakeholders are being required to fulfill the role of the RWQCB, “to calibrate the model and develop TMDLs/allocations that address all hydrological conditions.” It appears inappropriate for the stakeholders to regulate themselves. This sentence also does not deal with the idea of whether multiple targets are appropriate for the Big Bear reservoir.
- N29 **Section 6.0, Pages 84-85, ¶ 3 & formulae:** a) As noted in N08, the urban stakeholders are partially responsible for the load allocations from the upper watershed because floodplain deposition has been reduced by channelization and loss of floodplain due to making the surface impervious. An acknowledgement is needed here relative to this fact. The formula for $\sum LA$ needs to be amended to include a portion associated with urban. b) The TMDL formula should also include an assessment of the nutrient load associated with natural background erosion.
- N30 **Section 7.0, Page 87, ¶ 1:** The third sentence should be amended to indicate that the greatest loading of nutrients will occur following a significant wildfire.
- N31 **Appendix A, Page A2, Table A-1:** Having 2 and 3 samples is insufficient to provide any statistical confidence in averages. In addition, the median has no meaning with only 2 samples. Also, the method for calculating an average value from 3 values when 1 is a non-detect is not stated. (see N03)
- N32 **Appendix A, Page A11, Figures A-3 and A-4:** The title of this figure “percentage of average” does not match the y-axis. Either the title or the y-axis needs to be changed.
- N33 **Appendix A, Page A12, Table A-8:** The record of data is insufficient to make the claim that 1999-2003 was an “extreme” dry event.
- N34 **Appendix B, Pages B5-B6:** Was an assessment made to statistically show that photic and bottom data came from the same population distribution and also to show whether these two data sets could be combined? To determine the appropriate statistical tests to perform, each of the two separate data sets should be individually checked for normality and lognormality. The Shapiro-Wilk Test for Normality is appropriate for this testing. If the data is normal or lognormal, then the data sets can be compared using the t-test for the mean and the F-test for the standard deviation. If the data is shown to be lognormal, then the mean and standard deviation for each data set must be computed appropriately before applying the t-test and the F-test. If the data sets are shown to be nonparametric, then the Levene test can check for statistical homogeneity of variance and the Kruskal-Wallis test can be used to check the statistical similarity of the median values. Only after these assessments are made can conclusions be drawn regarding the entire data set. Please provide the data for the photic and

bottom as separate data sets and perform this more complete statistical analysis. This analysis provides the basis for the 31 ug/L value presented in the report.

N35 **Attachment A, Page 1 of 17, Big Bear Lake, ¶ 1:** Groundwater is another contributor to the lake through base flow. This source of water should be added.

N36 **Attachment A, Page 4 of 17, Table 5-9a-c:** Please make this table coincide with information and comments related to Table 3-1. Footnote c indicates a 5-year running average, but the staff report speaks of annual averages.

N37 **Attachment A, Page 6 of 17, 1.C. 1., Editorial:** The third word should be “of” not “f”.

N38 **Attachment A, Page 6 of 17, 1.D.:** An acknowledgment is needed that a post-wildfire condition would be the worst critical condition for this watershed relative to loading.

Implementation Plan/Monitoring Program – legal issues

The Organic Administration Act authorizes the Secretary of Agriculture to manage National Forest System (NFS) Lands (16 U.S.C. §§ 473-475, 477-482, and 551). Originally, this authority was given to the Secretary of the Interior. In 1905, Congress transferred administrative authority over the management of surface use of forest reserves from the Secretary of the Interior to the Secretary of Agriculture pursuant to the Transfer Act of 1905, 16 U.S.C. § 472. Moreover, funds can only be expended for the purpose for which they have been appropriated (16 U.S.C. §§ 1301). Thus, the Forest Service only has jurisdiction, custody, and control to administer or to conduct activities on NFS lands (16 U.S.C. § 551). The Forest Service is typically only allowed to allocate funding to activities on NFS lands. In some limited circumstances, monies can be expended on private lands, but only when the project benefits NFS lands or resources (e.g., Widen Amendment, 16 U.S.C. § 1011(a) and P.L. 105-227 § 323).

Participation in developing a coordinated monitoring plan, as well as certain of the required elements of that coordinated monitoring plan, may require the Forest Service either to conduct activities off NFS with this task as part of a coordinated group may be problematic. The Forest Service could participate in a coordinated effort only within the legal constraints described above. The Forest Service could not be compelled either to undertake activities on private lands where it lacks authority to act or to spend funds it is not authorized to spend.

Monitoring to demonstrate compliance with TMDLs, including developing and providing data necessary to review and update the TMDLs is a requirement for states, not a person, under the CWA (33 U.S.C. § 1313(d)(1)(C)). As a basis for these additional monitoring requirements, the Regional Board appears to be relying upon Cal. Water Code § 13267, which provides authority for the Regional Board to either investigate, or require the investigation of, the quality of any waters of the state within its region and “any person who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste within its region...or outside of its region that could affect the quality of waters within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the regional board requires.” Cal. Water Code §13267(b)(1). In requiring the report, the Regional Board shall provide the person with a written explanation with regard to the need for the reports and identify

the evidence that supports requiring that person to provide the reports. Cal. Water Code § 13267(b)(1).

Investigation of water quality is the state's responsibility under the CWA. 33 U.S.C. §1313(d)(1)(C)(each state shall establish for [impaired waters]...the total maximum daily load). The requirements in the CWA for a person are directed to the control and abatement of water pollution through control and abatement of point source discharges and nonpoint source releases. Investigation is not the control and abatement of water pollution. Investigation falls outside the scope of the waiver of sovereign immunity, and the Forest Service could not be compelled to comply with investigation tasks.

In addition, investigation tasks conflict with the CWA and other provisions of federal laws relating to the limitations of Forest Service jurisdiction and ability to expend funds. To the extent that California law is inconsistent, the principles of preemption support the conclusion that the Forest Service could not be compelled to comply with these tasks. If a state statute conflicts with, or frustrates, federal law, the former must give way. See, *CSX Transp., Inc. v. Easterwood*, 507 U.S. 658, 663 (1993).

N39 Attachment A, Page 8 of 17, Table 5-9a-f: Given the complexities in the watershed as well as the annual budgetary process and limited funding (see comment S07), the SBNF feels that the time frames listed in Attachment A, Table 5-9a-f are overly optimistic and do not take into account the timing of BPA approval nor the time available for Forest Service staff and approval process.

- As stated in S20, Task 1 should have a minimum time frame of 1 year.
- Task 4: The plan would require the input of multiple technical specialists as well as review by decision makers, and possibly public input. The RWQCB should take into account that all proposed actions by the Forest Service are required to assess NEPA requirements, which includes public comment, adding time to any planning period. Scheduling and budgeting for these tasks is also dependant on when the BPA is approved. As the Forest Service conducts the planning for the following fiscal year in July and August, the compliance date for this task should be set relative to when the BPA is approved, but not less than 1 year following approval. The economics associated with collected data for five storms per year and eight samples per storm should be evaluated relative to the watershed budgetary comments made in S07, reiterated here.
 - Though the SBNF lands comprise ~65% of the watershed, the watershed in question comprises only 2% of SBNF land. Given that our 2005 planning budget for all SBNF watershed management activities was ~\$185,000, it may be economically infeasible for the SBNF to contribute the resources required to collect this level of data. As with all projects on Forest Service Land, the Big Bear Lake Nutrient Monitoring Plan will have to take into account the NEPA process.
- Task 6: Reiterating the timing and budgetary restraints on the SBNF, the effective date for this task should be a minimum of 1 year following BPA approval.
- Task 7: Given the complexity of the project to reduce in-lake sediment, the time frame of 1 year should not start until the Army Corp of Engineers has completed their feasibility study. In addition, if the feasibility study shows that this task is not feasible, then this task should be removed from the implementation requirements.

- Task 9: Given the complexity of the project and the limited staff available at the SBNF to support this task, the effective date for this task should be a minimum of 18 months following BPA approval.
- Task 12 has the implicit assumption that adequate data from average and wet years are collected between now and 2012. Language is required that allows this date to be extended if inadequate data is collected.

N40 **Attachment A, Page 8 of 17, Table 5-9a-f:** The following comments are in regards to the legal information provided above. An acknowledgement needs to be made in the report discussing the possible limitations on the Forest Service with the participation and completion of these tasks. In some cases, listed below, the legal ramifications will prevent the Forest Service from participating, and therefore, the US Forest Service should not be named as a participant in the particular tasks.

- Task 4: The Forest Service may develop a monitoring plan within its authorities to fulfill Task 4.1. To the extent feasible, the Forest Service's proposed monitoring plan should address all the elements specified by the Regional Board. However, the Forest Service may be precluded from including all elements because of the legal constraints described above. For example, most of the monitoring stations are located off of Forest Service land, so the Forest Service cannot participate in data collection from these monitoring stations. In addition, the monitoring listed in the tasks goes beyond demonstrations of compliance to monitoring for investigation. As stated previously, the Forest Service cannot be compelled to perform investigation monitoring. With respect to Tasks 4.1 and 4.2, the Forest Service may comply in a fair and reasonable manner, to the extent feasible, within jurisdiction and funding constraints.
- Task 6: The Forest Service may comply in a fair and reasonable manner, to the extent feasible, within jurisdiction and funding constraints. For this task, the Forest Service will be able to provide collected data, within the constraints listed in Task 4 above. However, the Forest Service is of the opinion that funding a modeler is a task required of the Regional Board, and could not be compelled onto the Forest.
- Task 7: The focus of this task is on in-lake control of existing sediments, rather than on the CWA's objective of source control and abatement. The state's efforts in this task are more akin to a cleanup alternative for historical and existing sediments in the lakes. The CWA does not provide a remedy for the cleanup of historic pollution. As discussed above, to the extent that the tasks are not requirements related to the control and abatement of water pollution, the federal government has not waived its sovereign immunity, and the Forest Service could not be compelled to comply. However, the Forest Service could make a good faith effort to determine whether it can propose some type of monitoring program within its authorities that could contribute to the state's efforts.
- Task 8: As discussed above, the investigation of water quality is the state's responsibility. 33 U.S.C. § 1313(d)(1)(C). In addition, there is no provision in the CWA for development of technologies to control the presence of noxious and nuisance aquatic plants. Given that this task does not appear to be a requirement for the control and abatement of water pollution, or related to the subject matter of the CWA, the federal government has not waived its sovereign immunity, and the Forest Service could not be required to comply with this task.

- Task 9: Nothing in this task is a requirement of the CWA. Nor, like Task 8 above, is it even within the scope of the CWA. On its face this Multimetric Index Development Plan does not appear related to state obligations under the CWA. However, to the extent that this task is related to the development either of TMDLs or a development of a methodology for TMDLs, this is the state's responsibility under the CWA. The federal government has not waived its sovereign immunity with respect to this task, and the Forest Service could not be not required to comply with this task.

N41 **Attachment A, Page 9 of 17, Task 2:** The SBNF questions the requirement for the US Forest Service to be issued an NPDES permit. What point source is the SBNF responsible for? Why was this aspect of the task not listed in Section 9.1, Page 91?

N42 **Attachment A, Page 11 of 17, Table 5-9a-g:** With the Zoo's current lease ending and the plan to move the zoo to the north side of the lake in 2009, under special use permit with the Forest Service, will MWDC6 continue to have to be monitored in the future? Will an additional monitoring station be required?

“J” refers to “Joint” because the comments refer to both the sediment and nutrient TMDL reports.

- J01 Because forest and open space areas naturally export nutrients, the USFS believes that these areas should be considered potential problems only if there is supporting evidence, such as nutrient export rates that exceed the rates expected for these ecosystems under relatively natural conditions. This approach of considering and accommodating natural background loading has been widely applied throughout California by other Regional Boards and the Environmental Protection Agency in addressing water quality impairments associated with other natural constituents (e.g., sediment, temperature).
- J02 The SBNF would also appreciate if the RWQCB follows SB 469 TMDL Guidance to evaluate the natural background condition and conducts a use attainability analysis. SBNF disagrees that naturally eroding sediment is a pollutant. All references to naturally eroding sediment should list it in the natural background condition category and not as a “waste.”
- SB 469 states that conducting a Use Attainability Analysis (UAA) may be the appropriate regulatory response in cases where "(1) Naturally occurring pollutant concentrations prevent the attainment of the use, and (4) Dams, diversions, or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the waterbody to its original condition or to operate such modification in a way that would result in the attainment of the use." (SB 469, Appendix C-1 to C-2).
 - In evaluating the natural background condition, the following website provides downloads of Fire Regime and Condition Class (FRCC), Fire Threat, and Post Fire Erosion Potential.
 - frap.cdf.ca.gov/data/frapgisdata/select
 - In addition, our information shows that the return interval of fire for this watershed is 30 to 50 years. This return interval for fire should be built into the ecological succession of the model to allow for percentages of the land to be in the barren, grasses, shrubs, forested, etc conditions. This analysis should replace the provided model of fully forest north and fully forested south.
- J03 **Nutrient: Page 5, ¶ 1 and Page 7, #6; Sediment: Page 5, ¶ 1 and Page 6, #6:** The SBNF agrees that critical conditions are an extremely important topic that must be discussed fully and dealt with appropriately. The SBNF does not agree that the most critical condition occurs during summer and during dry years. In our opinion, the most critical time occurs following a wildfire. The reduction in plant cover will cause an increase of sediment loading. “Erosion after wildfire 40 times greater than erosion after prescribed fire with buffers. Erosion after thinning, is 70% of prescribed fire with buffers, or about 1% of wildfire” (Elliot and Robichaud, 2001), which will increase the input of nutrients. The SBNF believes that this critical condition needs to be more thoroughly addressed.
- J04 **Nutrient & Sediment: Page 7, #8; Sediment: Page 32, ¶ 2 & Page 77, ¶ 1; Nutrient: Section 4.3, Page 62, ¶1 & Section 9.0, Page 90, ¶ 3:** As the owner of the dam and the lake bottom, the BBMWD should be defined as a local stakeholder, not just a cooperating partner. Ownership of the lake bottom indicates ownership of the sediment included on the lake

bottom since the formation of the entity in question, though not of sediment already laid down before the dam was built. In addition, the language should be the same in both reports.

J05 Nutrient: Page 7, #8 and Page 20-21 Land use; Sediment: Page 7, #8 and Page 18-19

Land use: Since each of the Big Bear Mountain Resorts has some land on SBNF under special use permits, reducing nutrient and sediment loading from the ski areas could be considered a reduction from the forest if the treatments occur on SBNF land. Likewise, BMP implementation and monitoring can be written into the special use permits by the SBNF. Snow Forest has reverted back to the Forest Service and is no longer a resort. Its acreage should be added to the Forest category and the model should be adjusted appropriately.

J06 Nutrient and Sediment: Section 1.1, Page 10, ¶ 3: Please present the evidence (e.g. literature references) that the groundwater basin is being mined. Mining implies that extraction is exceeding input and that the aquifer in question is trending to a lack of available, usable water.

J07 Nutrient and Sediment: Editorial: Figure 1-1 should list what "Field" this watershed is showing.

J08 Nutrient and Sediment: Section 1.1, Page 14, Rathbun Creek - State Highway 18 to Big Bear Lake: Does the "background" modeling deposit sediment on the floodplain? If the city channelization prevents deposition that would naturally occur (see reference below), then the city has some responsibility as to the increased sediment loading. If such sediment loading comes from a creek not under an NPDES permit, then the city's load needs to be increased in the area of external non-point source loading.

- Using a palynological approach, measured overbank deposition rates increased by 4-10 times within years of logging events and that the increased rates persisted for less than 4 years. After logging-induced deposition peaked, overbank deposition decreased 60-70% relative to the pre-logging background values. The decreased deposition rates persisted for over 40 years (Constantine et al. 2005).

J09 Nutrient: Page 20, Wastewater; Sediment: Page 18, Wastewater: Please expand on what the "limited exemptions" are and discuss how the exemptions influence nutrient loading.

J10 Nutrient: Page 20, Land Use; Sediment: Page 18, Land Use: The final sentence starting "This site" implies that the previous two sites are not "contributors of sediment and potentially nutrients." This sentence should be altered to indicate all three areas are potential contributors.

J11 Nutrient: Page 31; Sediment: Section 2.1, Page 33: Please clarify your definition of "controllable water quality factors." The controllability of the issue must be further expanded on, especially given that the majority of runoff and nutrient transport occurs in "wet" years when most sediment controlling structures are not designed to accommodate such flows.

- **Sediment, Table 6-1:** Please clarify the notion of “controllable water quality factors” as it applies to setting the sediment loading target to 10% less than the modeled natural background erosion (since 10% reserved for MOS). Since the watershed is no longer pristine, even meeting the modeled natural background sediment erosion is unlikely. To set the target 10% less is unreasonable, and arguably un-controllable.
- The SBNF is concerned that a zero discharge standard would severely hamper our fuels reduction activities, which in the long-term will reduce the risk of large discharges associated with wildfire and protect the communities surrounding Big Bear Lake.
- Furthermore, we believe the estimated background erosion rates are too low because they only consider fully forested conditions with no natural wildfire. Under natural conditions, the Big Bear watershed would likely have burned 2-3 times in the last 100 years. As a result of fire suppression, however, there have been no large fires. This reduction in sediment and nutrient loading is important, but not considered in the analysis.

- J12 **Nutrient: Section 6.0, Page 84, ¶ 2:** Please clarify why no MOS is used for the nutrient TMDL given the many comments that the model has numerous deficiencies but that an MOS was used in the sediment TMDL when similar conditions exist relative to a complete lack of understanding.
- J13 **Nutrient: Section 8.0, Page 89, ¶ 2 and ¶ 3; Sediment: Section 8.0, Page 76, ¶ 2 and ¶ 3:** Of the sources of uncertainty, both reports share the first 3 points. Point 6 in the Nutrient TMDL is equivalent to Point 4 in the Sediment TMDL. The final sentence of ¶2 is the same. The discussion in the nutrient TMDL discusses how conservative assumptions were applied. The final sentence of ¶ 3 is the same in both reports. It seems appropriate that unless conservative assumptions were not used in the sediment TMDL report (isn’t supported by the report) that the MOS should be similar in both cases, namely implicit.
- J14 **Nutrient: Section 9.0, Page 90, ¶ 3; Sediment: Section 9.0, Page 77, ¶ 1:** The identification of stakeholders needs to be updated (see comment J04). Ownership of the lake bottom indicates ownership of the sediment included on the lake bottom since the formation of the entity in question, though not of sediment already laid down before the dam was built. As such BBMWD should be an identified stakeholder.
- J15 **Nutrient: Section 9.1, Pages 91, 1.b); Sediment: Section 9.1, Page 77, 1.a.:** Does the proposed activity coincide with the current MAA indicating that “issuance of waste discharge requirements for nonpoint source discharges will be waived by the Regional Board” given that the SBNF has been implementing BMPs for all projects on its land?
- J16 **Nutrient: Section 10.2, Page 93; Sediment: Section 10.2, Page 80:** The RWQCB should acknowledge that installation and maintenance of a “high elevation weather station” on SBNF land will require that NEPA be followed, and the location of the station could cause environmental damage and mitigation requirements.
- J17 **Nutrient: Section 10.3, Page 94, bullet 2; Sediment: Section 10.3, Page 80, bullet 3:** Does the RWQCB contemplate that the only option on modeling is to use the model

developed by Hydmet, Inc? The USFS already has a model, WEPP, designed to assess the effectiveness of BMPs applied on Forest Service land. Could the SBNF use the WEPP model to fulfill this purpose?

- WEPP model was used to show that erosion from fuel management operations, including thinning and prescribed fire, are less than wildfire, even when road erosion rates are included. Thinning and prescribed fire leave 85% surface cover. Wildfire tends to leave only 45% surface cover. Generally, forest erosion only occurs after a disturbance, then drops by 90% each subsequent year [Elliot and Robichaud, 2001, Elliot and Miller, 2002].
- Erosion prediction methods are used to evaluate different management practices and control techniques. One of the prediction tools recently developed is the Water Erosion Prediction Project (WEPP; Flanagan and Livingston 1995). WEPP is a physically-based soil erosion model, and is particularly suited to modeling the conditions common in forests.

J18 Nutrient: Section 11.0, Page 97, Table 11-2; Sediment: Section 11.0, Page 82, Table 11-2: Does the cost range given include costs for sampling the dredged material for constituents beyond those listed in the TMDL (e.g. RCRA constituents, lead, PCBs, etc)? Does the cost range given include transport of the dredged material to a landfill able to accept contaminated waste? See the Attachment to Resolution No. R8-2005-00002, Chapter 5 – Implementation Plan, Page 5-42, ¶ 4: PCBs in fish tissue have been indicated.

J19 Nutrient: Section 11.0, Page 98, Table 11-3; Sediment: Section 11.0, Page 84, Tables 11-3 and 11-4: These tables are incomplete in that they do not show the monetary contributions that the SBNF has made to the Big Bear Lake watershed. The reports state that over \$4 million will be spent by the end of 2007. The following details how the SBNF has spent over \$20 million between 2001 and 2005 in protecting the urban infrastructure from catastrophic wildfire as well as keeping the increased sediment loading from wildfire out of Big Bear Lake.

- Erosion after wildfire 40 times greater than erosion after prescribed fire with buffers. Erosion after thinning is 70% of prescribed fire with buffers, or about 1% of wildfire. (Elliot and Miller, 2002)
- In 2002 in the fall, the SBNF started cutting dead trees and selling them for firewood. Spending is estimated at \$250,000 for cutting trees, assisting the public with firewood cutting (bucking), and burning slash. This work took place on the sides of Forest Service roads in the Fawnskin area and also behind Sugarloaf.
- In 2003 there was a fire team assigned to protect Big Bear from a catastrophic fire. The team spent about \$1,000,000 cutting fuel breaks around Big Bear City, Big Bear Lake, Fawnskin and other subdivisions East of Fawnskin, etc. Following the Grand Prix/Old Fire, in winter 2003 and 2004, about \$500,000 was spent rehabilitating those control lines. The rehabilitation used the BMPs of waterbarring, covering the lines with chips, recontouring benches in some cases, and fixing creek crossings, including Kid Creek. In addition, much of the work was done with excavators with thumbs so that vegetation could be put on the lines (covered and blocked) as they were being rehabilitated.
- In 2005, the SBNF has spent about \$2,500,000 in the Big Bear Watershed. The SBNF has a continued vegetation management projects behind Sugarloaf (cutting and

chipping), b) removed all of the dead trees from the 3 Big Bear tracts, Metcalf, Lakeview, and other tracts. These projects again removed large dead trees that if consumed by fire would have damaging effects on the soil and hence the watershed. The SBNF has been working with NRCS on these tasks.

- Also in 2005, the SBNF entered into a partnership agreement with the ski areas to do restoration work in the tree islands. We intend to contribute and have matched \$300,000 for a total of \$600,000.
- Also the SBNF has invested millions of dollars on the Santa Ana side of the Mountain (the fire prone South facing slope) in order to keep fires from going over the Mountain and into Big Bear. One of the biggest threats to the Bear Creek Watershed comes from the neighboring and downstream drainages, so even though this investment is outside the watershed in question, it is directly tied to reducing sedimentation into Big Bear Lake.
- Also between 2001 and the present, the SBNF has successfully suppressed every lightning and man caused fire that has started in the Big Bear Valley in order to protect the watershed of Big Bear. The cost of these activities, counting pre-suppression work is on the order of \$16 million. This includes staging a type 1 helicopter at the Big Bear Airport for several of those seasons, maintaining a hotshot crew during the period, bringing in resources such as smokejumpers and rappellers, etc. as well as Air tankers and other assets.
- Road maintenance dollars spent in the Big Bear watershed from 2001 through August 2005 total \$119,500. All Forest Service roads are constructed with State approved BMPs according to the MAA between the USFS and SWQCB.
- In addition, see comment S10 as it details BMP effectiveness in multiple cases for multiple project types.
- The above bullets do not count grants from the Forest Service made to the County of San Bernardino, nor does it count all the other protection work and native plant restoration work that has been contributing by FS District staff and the non catalogued roads that have been closed, and the money used to manage off highway vehicle (OHV) use to limit it effects on the watershed.

J20 Nutrient: Section 12.0, Page 99, ¶ 2; Sediment: Section 12.0, Page 86, ¶ 2: The SBNF disagrees with the assessment that there “would be no potentially significant impacts on the environment caused by adoption of this Basin Plan amendment.” Mitigation measures may be required in numerous areas, as detailed in the CEQA Comments section, below.

J21 Nutrient: Section 12.0, Page 99, Alternative 2; Sediment: Section 12.0, Page 86, Alternative 2: Has the RWQCB taken into account the time requirements placed on the USFS relative to NEPA compliance? NEPA is required on all Forest Service projects. Given that the budget process has been completed for the FY2006, any projects beyond the Snow Forest restoration will be required to await an additional funding cycle. Given that determination of seasonal effects requires a minimum of 3 years of data and given the variability inherent in the data, a compliance date of 2010 seems unreasonable. What if the BPA is delayed? Will the compliance dates be delayed as well? Please address the reasonableness given the aforementioned issues, especially in regards to the scheduled approval date of the BPA.

J22 **Nutrient: Section 13.0, Page 100, ¶ 2; Sediment: Section 13.0, Page 87, ¶ 2:** The SBNF takes exception to the term “just recently” in regards to participation in the TMDL workgroup. As these documents may be referenced in the future, a more precise date should be used or the “and just recently” language should be removed. In addition, as a Management Agency, the SBNF has been an active steward of our lands using BMPs (see comment J19 and S10 for effectiveness studies). The implication of the “just recently” statement is that the SBNF has not been involved in watershed activities that are helpful to the protection of Big Bear Lake. Please clarify this statement and acknowledge the ongoing participation of the SBNF as a Management Agency.

CEQA Checklist comments

Many of comments below will refer to the ongoing land management work in this watershed. A summary is provided here to reduce the redundancy of the comments.

- 1) Fuels treatment work: The SBNF is currently receiving Congressionally Earmarked funding to reduce fuel loading in the Big Bear Lake watershed. This thinning, masticating, and prescribed burning has the goal of reducing the risk of catastrophic wildfire to the communities surrounding Big Bear Lake. These projects, though they use BMPs, will reduce the cover on the forest floor and open the canopy, restoring the forest to a more natural, background state. These projects will also, in the short term, increase erosion of sediment. Given that erosion after wildfire is 40 times greater than erosion after prescribed fire with buffers and erosion after thinning is 70% of prescribed fire with buffers, or about 1% of wildfire (Elliot and Miller, 2002), this work is critical to this watershed. In addition, this work is supported by the Firesafe Council in the production of a Community Wildfire Protection Plan.
- 2) Fire suppression: Given that roads are a major producer of sediment (Beechie et al. 2003), it is anticipated that meeting the requirements of the sediment TMDL would require the closing and decommissioning of roads. As with any project on the forest, the National Environmental Protection Act (NEPA) would have to be followed before such work could be accomplished and one aspect would be whether the closing of the roads would adversely affect the Forest Service’s ability to suppress fire.

II. Determination

J23 Based on the comments below (J24 through J32), the SBNF recommends that the determination should be at least the second category (i.e. may have significant effect, but alternatives and mitigations available), with the possibility that some of the comments will push the determination into the third category.

III. Environmental Impact Comments

J24 **IV. Biological Resources – Would the project: e) Conflict with any local policies or ordinances protecting biological resources:** Both the fuels treatment work and the fire suppression work could be prevented by the implementation of these targets. As such, the

SBNF recommends that the “Less than significant with mitigation incorporation” box be checked and that an evaluation is made in the discussion section in lieu of this comment.

J25 **V. Cultural Resources, a) through d):** Implementing the TMDL will likely require the installation of engineered works to control and catch sediment. In each case, any project performed by the Forest Service requires that NEPA be followed. Relative to cultural resources, the regulations that the Forest Service must follow are listed in 36 CFS Part 800. In addition, the Forest Service has a Programmatic Agreement (PA) with the California State Historic Preservation Officer regarding the process for compliance with Section 106 of the National Historic Preservation Act. Attachment B of the PA discusses the Standard Resource Protection Measures, which shall be implemented as a part of NEPA to take into account the effect of all undertakings on historic properties. If the proposed project impacts a site eligible for the National Register of Historic Properties, and if the proposed project cannot be sited at another location, then the NEPA procedure will weigh the significance of reducing sediment relative to the TMDL versus the possible destruction of a historic site. To mitigate destruction of a historic site could require excavation and cataloging of the site in question, which is a highly expensive endeavor. Experience on the Forest indicates that mitigation of a 50 foot by 150 foot area can cost between \$50,000 and \$100,000. In addition, relative to located possible historic sites in the mountains, many, if not most, sites are located on or near watercourses. As such, the SBNF recommends that the “Less than significant with mitigation incorporation” or the “Potentially significant impact” box be checked for each of these and that an evaluation is made in the discussion section in lieu of this comment.

J26 **VI. Geology and Soils, a)iv) and b):** If the implementation of the TMDL prevented fuels treatments from being implemented because of the short term increase in sediment, and thus nutrient, loading, then the increased risk of wildfire would lead to an increased risk of landslides and soil erosion associated with wildfire. As such, the SBNF recommends that the “Less than significant with mitigation incorporation” box be checked and that an evaluation is made in the discussion section in lieu of this comment.

J27 **VII. Hazards and Hazardous Materials, a) and b):** As stated in comment J20, dredging of sediment will require sampling of the material prior to its transport and deposition at a new site. The possibility exists that the sampling protocol will discover hazardous substances in the sediment (e.g. lead [fishing sinkers], PCBs [though banned in 1977 are very persistent in environment, Nutrient TMDL Basin Plan Amendment states PCBs have been indicated in fish tissue], etc). If such hazardous substances are discovered from dredged materials, then they could pose a human health hazard during the transport, following an accident condition, and would have to be disposed of in a sanctioned landfill, thus raising the costs. As such, the SBNF recommends that the “Less than significant with mitigation incorporation” or the “Potentially significant impact” box be checked for each of these and that an evaluation is made in the discussion section in lieu of this comment.

J28 **VII. Hazards and Hazardous Materials, g) and h):** As detailed in 1) and 2) above, reduction in fuels treatments or decommissioning of roads to reduce erosion would interfere with the local Community Wildfire Protection Plan and could increase the risk of wildland fire. As such, the SBNF recommends that the “Less than significant with mitigation

incorporation” box be checked and that an evaluation is made in the discussion section in lieu of this comment.

J29 **IX. Land Use and Planning, b):** As detailed in 1) above, reduction in fuels treatments, which will increase sediment loading, and thus nutrient loading, in the short term, would interfere with the local Community Wildfire Protection Plan and could increase the risk of wildland fire. As such, the SBNF recommends that the “Less than significant with mitigation incorporation” or the “Potentially significant impact” box be checked for each of these and that an evaluation is made in the discussion section in lieu of this comment.

J30 **XV. Transportation/Traffic, e):** As detailed in 2) above, decommissioning of roads to reduce erosion would interfere with emergency access to wildland fires. As such, the SBNF recommends that the “Less than significant with mitigation incorporation” box be checked and that an evaluation is made in the discussion section in lieu of this comment.

J31 **XVII. Mandatory Findings of Significance, a):** As detailed in 1) above, if the sediment TMDL limits the Forest’s ability to conduct fuels treatments, which will increase sediment loading, and thus nutrient loading, in the short term, then the risk of wildland fire increases which gives the potential to degrade the quality of the environment in multiple ways. As such, the SBNF recommends that the “Less than significant with mitigation incorporation” box be checked and that an evaluation is made in the discussion section in lieu of this comment.

J32 **XVII. Mandatory Findings of Significance, b) and c):** As a part of the required NEPA done for every Forest project, a Cumulative Effects Analysis is conducted relative to erosion within a watershed. Implementation of projects could be hampered given the limited time frame (i.e. 10 years) of the TMDL. If the TMDL lowers the erosion target for a particular watershed such that fuels treatments cannot be done in a timely manner, while the SBNF is receiving Congressionally earmarked funding, then the cumulative effect is higher risk for fire in that watershed and higher risk of potentially significant effects to human health. As such, the SBNF recommends that the “Less than significant with mitigation incorporation” box be checked and that an evaluation is made in the discussion section in lieu of this comment.

DEPARTMENT OF TRANSPORTATION

DIVISION OF ENVIRONMENTAL ANALYSIS, MS 27

1120 N STREET

P. O. BOX 942874

SACRAMENTO, CA 94274-0001

PHONE (916) 653-7507

FAX (916) 653-7757

TTY (916) 653-4086

*Flex your power!
Be energy efficient!*

HAS 9/7/05
2005 SEP -6 PM 3:58
HNS
SES nws cc

September 2, 2005

Heather Boyd, Environmental Scientist
Inland Waters Planning Section
Santa Ana Regional Water Quality Control Board
3737 Main Street, Suite 500
Riverside, CA 92501
Fax: (951) 781-6288
Email: hboyd@waterboards.ca.gov

Re: Comments on "Staff Report on the Nutrient Total Maximum Daily Loads for Big Bear Lake"

Dear Ms. Boyd:

The Department of Transportation (Department) appreciates the opportunity to comment on the subject report, dated June 1, 2005. We support the efforts of the Santa Ana Regional Water Quality Control Board (RWQCB) to protect the environment and achieve the best water quality possible. Our Department manages 18 miles (approximately 70 acres) of roadway throughout Big Bear. The watershed draining into Big Bear Lake measures approximately 23,000 acres. Our Right-of-Way (ROW) constitutes 0.3 percent of the entire watershed.

We have concerns about this Total Maximum Daily Load (TMDL), especially regarding the:

1. Primary source of sedimentation for the lake;
2. Lack of identification and quantification of the natural background loads; and
3. Lack of economic considerations.

Primary Source of Lake Sedimentation

The Department's first concern is the RWQCB's assumption that external sediment loads (storm runoff) are an indirect yet significant cause of dry period nutrient loading into Big Bear

Lake. On page 92 of the staff subject report, the RWQCB states:

“...it is recognized that external inputs remain in the lake for an extended period and contribute significantly to internal sediment loading and macrophyte growth, which are addressed by these TMDLs. Accordingly, the proposed implementation plan includes requirements for external nutrient dischargers to participate in the development of internal sediment loading control measures and macrophyte reduction/aquatic plant management programs.”

A studyⁱ by Dr. Matthew E. Kirby, Ph.D., Assistant Professor for the Department of Geological Sciences, California State University, Fullerton, revealed that the primary sedimentation in Big Bear Lake over the past 40 years was the result of prolonged low level of the lake and not external inputs.

The Department should not be required to participate in the development of internal sediment loading control measures and macrophyte reduction/aquatic plant management programs because:

- a. There is a zero percent reduction from the Urban Point Source Load of both Total Nitrogen and Total Phosphorus for this TMDL;
- b. The results of Dr. Kirby’s study verify that internal loading of nutrients is not caused by external sediment loads; and
- c. Total Nitrogen and Total Phosphorus loads from the Urban Point Source Load during an average year represent a very small fraction of the total load compared to the loading from internal sources. External inputs that apparently “remain in the lake for an extended period” do not “contribute significantly to internal sediment loading and macrophyte growth” compared to the significant internal sediment loading.

Identification and Quantification of Natural Background Loads

Our second concern is the lack of identification and quantification of the natural background loads. The State Water Resources Control Board (SWRCB) defines, a TMDL as “The sum of the individual wasteload allocations for point sources, load allocations for nonpoint sources and natural background, and a margin of safetyⁱⁱ.” In the TMDL for Nutrients in Big Bear Lake, the natural background is not included in the load allocations on page 84 of the staff report. The TMDL needs to be amended to include natural background in the load allocations. The U.S. Army Corps of Engineers is currently engaged in a study of Big Bear Lake that involves performing 450 sediment cores of the lake bottom. This study will help identify the natural background loads and the primary source of sedimentation in the lake. The Department requests that the RWQCB postpone the finalization of this TMDL until the Corps’ study concludes and quantifies the sediment loads associated with background conditions. A

ⁱ Matthew Kirby, M.E., *Determination of Sedimentation Rate and Sedimentation Processes at Big Bear Lake: Using a Paleo-Perspective to Understand Modern Sedimentary Systems*, Contract Report submitted to Big Bear Municipal Water District, 41pp. (2005)

ⁱⁱ State Water Resources Control Board, *Revised Draft Water Quality Control Policy for Addressing Impaired Waters: Regulatory Structure and Options* (2005)

SWRCB reportⁱⁱⁱ indicates that if natural background levels exceed water quality standards (WQS), revision of WQS is appropriate. The Department requests that the RWQCB postpone finalization of the TMDL until it determines whether the natural background levels exceed the WQS, in which case the WQS will need to be revised, and the TMDL will need to be recalculated.

Economic Considerations

Finally, the Department is concerned with the economic considerations in this report. A SWRCB memorandum^{iv} indicates proposed RWQCB regulations, such as the regulatory provisions of basin plans, must include:

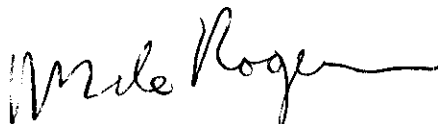

- An environmental analysis of the reasonably foreseeable methods of compliance with those standards or requirements; and
- A consideration of economic factors.

This memo also cites California Public Resources Code Section 21159, which states that because TMDLs contain quantifiable targets and load allocations (which together can be considered performance standards), the RWQCB must:

- Identify the reasonable foreseeable methods of compliance with the wasteload and load allocations; and
- Consider economic factors for those methods.

Thank you for the opportunity to comment on this matter. If you have any questions, please call Ivan Karnezis of my office at (916) 653-5417.

Sincerely,


 MICHAEL FLAKE
Chief
Storm Water Policy

ⁱⁱⁱ State Water Resources Control Board, *SB 469 TMDL Guidance: Attachment A: Impaired Waters Regulatory Decision Tree* (11/22/04)

^{iv} State Water Resources Control Board, *Economic Considerations in TMDL Development and Basin Planning* (10/27/99)

DEPARTMENT OF PUBLIC WORKS

FLOOD CONTROL • SOLID WASTE MGMT • SURVEYOR • TRANSPORTATION

COUNTY OF SAN BERNARDINO
PUBLIC AND SUPPORT
SERVICES GROUP

825 East Third Street • San Bernardino, CA 92415-0835 • (909) 387-8104
Fax (909) 387-8130



PATRICK J. MEAD
Director of Public Works

August 31, 2005

Gerard J. Thibeault
California Regional Water Quality Control Board, Santa Ana Region
3737 Main Street, Suite 500
Riverside, CA 92501-3339

File#10(NPD)-2.06

RE: COMMENTS ON THE STAFF REPORT AND PROPOSED BASIN PLAN AMENDMENT PRESENTED AT THE AUGUST 26, 2005 PUBLIC WORKSHOP: INCORPORATION OF TOTAL MAXIMUM DAILY LOADS FOR NUTRIENTS IN BIG BEAR LAKE

Dear Mr. Thibeault:

The San Bernardino County Flood Control District (District) has recently reviewed the Staff Report and the draft Basin Plan Amendment (BPA) for the Nutrient Total Maximum Daily Loads in Big Bear Lake, as presented at the Regional Board Public Workshop on August 26, 2005. The implementation of these Total Maximum Daily Loads (TMDLs) has substantial implications for the Permittees under the Municipal Stormwater Permit for the Santa Ana River Watershed in San Bernardino County (Order No. R8-2002-0012) (MS4 Permit).

Due to the complexity of the Staff Report, at this time, we are commenting primarily on the larger policy issues, and intend to review the technical aspects more thoroughly in the near future. We also understand that the Nutrient Staff Report and draft BPA will likely undergo revision in the near future to incorporate relevant information and/or requirements from the proposed sediment TMDL (Staff Report and draft BPA), for which a public workshop was not conducted at the August 26, 2005, Regional Board meeting.

The District understands that the development of these TMDLs is a complex task requiring significant technical support. We appreciate the efforts of Regional Board staff and the stakeholder work group (Workgroup). The Big Bear Municipal Water District (BBMWD) has led the Workgroup efforts and successfully engaged the Big Bear community in this issue. Through the Workgroup, significant funding has been secured to collect data and conduct needed investigations. Some investigations are complete and others are ongoing.

As stakeholders, we support all of the comments made by Mr. Tim Moore of Risk Sciences, including verbal comments made at the August 26 Workshop, and subsequent written comments. As the Principal Permittee under the MS4 Permit, the District provides the following comments on the Nutrient TMDL Staff Report and draft BPA on behalf of the MS4 Permittees (the sixteen cities, the District, and the County of San Bernardino).

August 31, 2005

Gerard J. Thibeault

Comments on the Staff Report on the Nutrient TMDL for Big Bear Lake

Page 2 of 3

The purpose of the TMDL will be best served by allowing sufficient time to incorporate the findings of ongoing investigations into the TMDL provisions. In particular, the study currently being conducted by the U.S. Army Corps of Engineers should provide essential data on the nutrient content of the lake sediments, which will have significant implications for the effectiveness of possible dredging activities. We, therefore, request that sufficient time be allocated to review these data before developing the TMDL allocations, and proposed implementation plan.

The Permittees should not be held responsible for nutrient loads from natural sources.

This is especially important for implementation of the TMDL, because all of the proposed nutrient load reductions are applied to the internal sediment source and/or the internal macrophyte source. While the stakeholders have applied resources to reduce the invasive plants, to reduce phosphorous concentrations in the lake, and to remove lake sediments through dredging, the vast majority of the existing lake sediments (and associated nutrients) are attributed to natural sources. To achieve the load reductions called for in the draft BPA, these existing natural sources will have to be addressed. Regulating these existing natural sources conflicts with the intent of the MS4 Permit which states that "This Order is intended to regulate the discharge of pollutants in urban storm water runoff from anthropogenic (generated from human activities) sources, and is not intended to address background or naturally occurring pollutants or flows" (Finding 13, page 5).

It is inappropriate to characterize natural sources as "waste discharges."

According to the Porter-Cologne Water Quality Control Act (§13050):

"'Waste' includes sewage and any and all other waste substances, liquid, solid, gaseous, or radioactive, associated with human habitation, or of human or animal origin, or from any producing, manufacturing, or processing operation, including waste placed within containers of whatever nature prior to, and for purposes of, disposal."

The internal loads of sediment and nutrients for Big Bear Lake do not meet this definition of "waste" (as suggested on pages 31, 47, and 91 of the Staff Report, and used throughout the draft BPA). This calls into question whether the Basin Plan objective for algae is applicable or appropriate for Big Bear Lake.

The Permittees should not be characterized as "responsible parties", as described in Section 10.3 of the Staff Report. Although we understand that we have compliance responsibilities under the MS4 Permit, the term "responsible parties" carries with it the regulatory implications derived from RCRA (Resource Conservation and Recovery Act), and is inappropriate in the TMDL.

The MS4 Permit already requires the Permittees to address pollutant sources (including nutrients). The MS4 Permit requires that urban activities and land uses be evaluated to determine the potential pollutants they may generate, and that best management practices (BMPs) be implemented for all potential pollutants. This includes the recently adopted Water Quality Management Plan, which specifies the process to develop post-construction BMPs for new and re-development projects, based on pollutants of concern. Other MS4 Permit BMPs, such as street sweeping, commercial, industrial, and construction site inspections, drainage facility cleaning, and public education, are already being implemented.

August 31, 2005

Gerard J. Thibeault

Comments on the Staff Report on the Nutrient TMDL for Big Bear Lake

Page 3 of 3

The Regional Board's Basin Plan objectives for nitrogen and phosphorous are apparently not protective, and should be evaluated and revised if necessary. The current Basin Plan objectives for nutrients are being met, in spite of the perceived beneficial use impairments. In the process of evaluating the appropriate nutrient levels to be included as water quality objectives in the Basin Plan, the requirements under Porter-Cologne §13241 will be triggered.

The use of modeling and literature values to set target nutrient levels warrants caution.

There are inherent uncertainties in applying general guidelines to a specific case without considerable evaluation. As discussed at the August 26 Workshop, it may be more damaging to reduce nutrients than to leave the system alone. The example discussed at the Workshop described how reducing nutrients might reduce the zooplankton, and result in a compromised fishery in the lake.

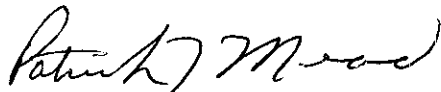
Big Bear Lake has exhibited a cycle of periodic lake level change over the past 120 years. The quality of the lake attributes varies considerably with these cycles, independent of any anthropogenic influence, with low water levels generally associated with less desirable conditions. This variability is intrinsic to the hydrologic regime and must be considered as part of the background state of the lake conditions.

The District appreciates the significant efforts from Regional Board staff to develop this TMDL, and the efforts of the BBMWD and the Workgroup to improve conditions in Big Bear Lake. We are committed to participating in Workgroup efforts for the foreseeable future.

Thank you for considering our comments.

If you have questions regarding our comments, please contact Matt Yeager or Naresh Varma at (909) 387-8109.

Sincerely,



PATRICK J. MEAD, P.E.

Flood Control Engineer

PJM:NPV:MAY;jm/BBL Nutrient TMDL Letter 083105

cc: Dennis Hansberger, Supervisor, Third District
Hope Smythe, CRWQCB-SAR
Heather Boyd, CRWQCB-SAR
Sheila Hamilton, Big Bear MWD
NPDES Coordinators
Matt Yeager, DPW--Environmental Management Division
MK Reading File

Peer Review
Proposed Nutrient TMDL for Big Bear Lake
K.H. Reckhow
Duke University

1. The nature of the water quality problem.

Based on data and graphs presented in Boyd (2005), measurements for total phosphorus and total inorganic nitrogen exceeded the water quality objectives for Big Bear Lake and thus resulted in the 303(d) listing. This is clear. However, it appears that there were relatively few exceedances. Perhaps natural variability and the impact of sample location and timing should be taken into consideration to make the case that a small percentage (e.g., 5% or 10%) of exceedances be permitted without listing.

2. Numeric target derivation

I am troubled by the numeric nutrient criteria – what is the relationship between the 25th percentile for N&P and the designated use? The goal of the TMDL is to achieve compliance with the water quality standard. The standard is essentially expressed in the designated use; the criterion is merely an assessable (measurable) surrogate for designated use. Presumably P&N would relate to phytoplankton density (expressed as chlor a); however, Figure 3.1 (Boyd 2005) shows a miserable bivariate relationship. As a final point with respect to N&P, I do not understand why the Basin Plan (Boyd 2005; page 32) specifies objectives for TOTAL phosphorus, yet for INORGANIC nitrogen – why the inconsistency?

The National Eutrophication Survey trophic state criteria (as well as Carlson's TSI, I believe) were set based on conditions in deep, nutrient-poor north temperate lakes (from Europe, the US, and Canada), and thus should not be given serious consideration for Big Bear Lake.

3. Identification of nitrogen and phosphorus sources

HSPF Model: Contrary to the Humphrey memo (2003), I do not believe that "EPA recommends HSPF "as the most accurate and appropriate management tool for the continuous simulation of hydrology and water quality in watersheds." Certainly, EPA recommends HSPF, since it is part of the EPA BASINS package, as are many other pollutant loading models. However, the statement that HSPF is "the most accurate" has no basis, as there is no evidence to confirm this statement. To be specific, there have been virtually no uncertainty analyses undertaken using HSPF, so accuracy is essentially unknown.

Despite the fact that the TMDL is focused on nutrient loading, the Humphrey memo provides judgmental estimates of the accuracy of the hydrology, but is mute on the accuracy of the nutrient loads from HSPF! Sadly, this is common practice, but it is a dis-service to the client who should want to know "How good are the nitrogen and phosphorus loading estimates?"

Apparently, the HSPF model was not calibrated due to insufficient data (Nutrient Budget study 2003, page 4-10). Normally, failure to calibrate would be associated with bad modeling practice. However, HSPF is over-parameterized, which means that even a

large data set cannot easily distinguish between many different sets of “optimal” parameters. This condition, termed “equifinality” (Beven, numerous references) could and should be addressed using a procedure such as generalized likelihood uncertainty estimation (GLUE) and would lead to the estimate of parameter sets (not individual parameters) all of which meet some pre-defined aquatic behavior criterion. GLUE has the added advantage of providing at least some basis for estimation of HSPF prediction error (See MOS discussion below).

4. Linkage Analysis

WASP Model: Tetra Tech and Steven Davies have considerable experience with WASP, so I assume that this should be a good modeling effort, given the limitations of the data and of WASP. The graphs in the Tetra Tech report comparing predictions and observations for nutrients and chlorophyll are not confidence-building (particular when considered as a scientific basis for costly TMDL decisions). However, it is refreshing to read the candid appraisals of the lack-of-fit on pages 32 and 33; Tetra Tech is to be commended for these statements, and for recommendations (bottom of page 33) for further study in support of the WASP model. I suggest that a regionalized (generalized) sensitivity analysis (Hornberger and Spear references) be used to assist in prioritizing new data collection.

5. TMDL/Wasteload Allocations(WLAs)/Load Allocations

Internal load is difficult to assess and predict on a whole-lake basis, but I do not know enough about the topic to comment critically on the Anderson and Dyal (2003) work. Load allocations determined using HSPF are subject to the weaknesses of the model that I discussed above.

6. Margin of Safety/Seasonal Variation and Critical Conditions

MOS: While implicit margins of safety are common; they are to some degree a “cop-out.” There are better approaches. For example, run an uncertainty analysis, and then use that assessment to guide initial actions in the adaptive process. Further, by doing the uncertainty analysis, you are determining what information is important to the TMDL assessment, yet is relatively poorly known – hence, what needs to be studied in the post-implementation adaptive phase.

Seasonal variations and critical conditions appear to be handled well.

7. Implementation and Monitoring

The TMDL implementation is proposed to be “phased” (Boyd 2005; Executive Summary). In fact, as stated, this TMDL is not phased; it is adaptive. While this may appear to be a picky semantic point, in fact there is a crucial difference. A phased TMDL is established at the time of initial approval and is then unchanged; it is simply implemented in a phased (gradual) manner. An adaptive TMDL is a “learning while doing” (NRC 2001) exercise; it may result in a change in the loading, the criterion level, or the designated use (effectively becoming a UAA). As such, an adaptive TMDL is most effective when the post-implementation monitoring/research is thoughtfully designed to assess compliance and to provide the critical learning opportunities. As noted under my MOS comments, undertaking an uncertainty analysis as the basis for the MOS would

naturally lead to priorities for post-implementation monitoring. This should be adequately described in the TMDL application (but it was not).

Other Comments

In brief, this appears to be a fairly typical TMDL that follows a routine procedure for approval rather than a clear linkage to attainment of designated use. Thus, my criticisms are to some degree directed at the overall TMDL process and not to this proposed TMDL alone.

November 4, 2005

Hope Smythe
Regional Water Quality Control Board
Santa Ana

Dear Hope,

I have reviewed the Staff Report on the Nutrient Total Maximum Daily Loads for Big Bear Lake (June 1, 2005). EPA commends you and your staff on completing an extensive evaluation of the existing data and approaches towards lake nutrient impairment to address the 303(d) listed impairments in Big Bear Lake. I have provided below my general and specific comments on the draft document.

General Comments

Overall, the draft technical TMDL appropriately provides the existing information and conducts the necessary analysis (i.e., source assessment, linkage analysis, waste load and load allocations, etc.). However, the document can improve by focusing on primary objectives achieved and less on the limitations of the data and analysis, which would be better addressed in one section. For example, the importance of setting numeric targets should be emphasized because these state and federally mandated requirements address serious water quality impairments and stressed beneficial uses.

The discussion on load reductions can improve by providing a more clear justification for the selected percentage reductions. The technical document currently provides an extensive discussion, but perhaps clarity of the selected reductions and numeric targets could be improved by having one explanatory statement for each finding.

The margin of safety discussion outlines all the uncertainties and limitations related to this technical TMDL. But, how do these uncertainties affect the actual load calculations? Do the TMDLs underestimate or overestimate the nutrient loads and/or load reductions? This section can be strengthened by identifying how the uncertainties affect the TMDLs, which consequently would provide more support for the identified numeric targets.

Specific Comments

Page	Section	Comment
31	Footnote 17	Is there currently an update since the review of the UIA objectives since Regional Board's 2002 Triennial Review List?

38	Figure 2.2	Are 6740.15 feet and 6729.58 feet referring to the elevation of the lake level? Also, do these two lake levels have the appropriate number of significant digits?
40	3 rd para.	Is the personal observation by Heather Boyd? The reference should include the primary person's name and date/year of observation.
43	Last sentence	Are there other commercial or non-commercial uses that "large mats of nuisance aquatic plants, and subsequent increase in temperature and pH and decrease in dissolved oxygen concentrations" can affect (besides fishery)?
44	1 st sentence	Please be more specific about "through the end of 2003". Which and how many months do that period cover?
44	Mid para.	Please cite other references or studies that show the similar pattern of early a.m. low dissolved oxygen concentrations.
46	Section 3.1, 1 st para.	What is the justification for including an interim and final target for total phosphorus, but only a final target for total nitrogen? Also, see page 76, first para., bold text. It appears that the primary reason for having the target is due to federal requirement. Perhaps, it would help to reemphasize the evidence of impairment and impacted beneficial uses in Big Bear Lake.
46	Section 3.1, last para.	Will the additional investigation of attainability and water quality measures needed to achieve the proposed final numeric targets take place after the TMDL is adopted?
48	1 st para.	Currently, the paragraph describes what information is needed to define the effects of macrophytes on beneficial uses. An equal discussion on what is clear or known about macrophytes should be included.
48	Footnote 25	This discussion is confusing and vague. Please delete.
51	Numeric Targets, last sentence	Please change sentence to: "When future studies are conducted to evaluate the link between macrophyte coverage and a healthy fishery in Big Bear Lake, Regional Board will review the proposed numeric target for macrophyte coverage, if needed."
52	2 nd para.	Please delete the paragraph because it adds to the unclarity and does not add to the discussion.
52	Numeric Target	Is it possible to show the calculation and reasoning behind the selection of the 25 th percentile and the resulting 10ug/L?
53	3 rd para.	Please delete the last sentence of this paragraph, beginning with, "These values would then be used to rerun....."
54	1 st para.	After the sentence, "This was considered sufficient due to the fact.....", please include a following sentence on appropriateness of the approach when addressing dry weather conditions, such as, "In addition, this is sufficiently appropriate when addressing dry weather conditions...."
57	Figure 4-4	It appears that the interpretation of this figure is not complete. For example, what about the effect of high urban loads between 1990-2003?
59	Last	The statement, "Most of the phosphorus is associated with the

	sentence	sediment/particulate discharge present when surface runoff occurs, with the most significant contributions from forest land use” is supported only by the year 1993 in Table 4-2 and not by Figure 4-4.
60	Table 4-2	It appears that the largest proportion of TP (70%) is from urban land uses. Why does the previous section state “the highest total phosphorus loads come from the forested areas....(p. 56, bottom)?”
61	Last sentence	Please modify last sentence to, “The loading rates that were used to calculate these estimates will be refined with empirical data for both wet and dry conditions during the implementation phase.” Is this the correct assumption that it is during the implementation period that atmospheric loads will be addressed?
66	2 nd para, bottom	Why did Tetra Tech used three times the average calculated volumetric density in their calculations? Footnote 40 did not explain why either.
67	4 th para.	The last sentence, “As stated previously, these values need to be compared.....” undercuts your findings and leads to general uncertainty of the report’s conclusions about atmospheric deposition.
68	Table 4-7	How confident are the authors of the proportion of nutrient loads from forest nonpoint source loads (43.5%)? Does this percentage match the author’s best professional judgement?
71	2 nd para.	Again, the last sentence of this paragraph undercuts the general initial findings. This technical report did not have all the data possible (and not many TMDLs do), but it did evaluate two different precipitation periods and found general patterns of rainfall and associated loads.
72	Top of page	Please explain the model runs. Some background information on the model runs would be helpful (just 1-2 sentences).
72	Last sentence	The conclusion is that during dry conditions, a reduction in external loads is unnecessary. However, a reasonable explanation as to why an external load reduction is then required was not provided. Perhaps, more clarification on the external load reduction coming from wet hydrological conditions need to be reemphasized.
74	First sentence	Modify sentence to, “ Second, WASP efforts to simulate macrophyte nutrient dynamics were achieved by adopting various assumptions regarding macrophyte nutrient loads, rates of uptake and release, etc., that were simulated via nonpoint.....” A sentence on how this is a common approach in the absence of specific data would help strengthen your conclusions.
74	3 rd para.	This paragraph is not clear. What are the main points of the paragraph.
75	1 st para.	What is the purpose of this extensive discussion on model limitations in the main technical document. How about have three short bulleted sections: (1) model limitations in bulleted form and (2) ramifications of these limitations, and (3) what the model does provide for this technical analysis.

76	2 nd para.	The last sentence in this paragraph offers an implicit margin of safety.
78	4 th para.	Why is model run 20a used to calculate the load capacity for interim targets?
78	5 th para.	This section's clarity can be improved by stressing the main points. Also, Do staff believe that macrophyte coverage should range between 30-60% due to BPJ or based on information from other lakes?
81	Figure 5-4	Why did TP and TN concentrations increase after the Sonar applications?
83	3 rd para.	If the final TN target cannot be achieved, why not include an interim target for TN?